

RECORD

44653 - 45120
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Book 71

Begin # 44653

End # 45120

Collection and Field Note Book

No. 71

(Jan. 16, 1964 - Feb. 9, 1964)
(44653 - 45120)

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Specimens collected... 3-7 visit only
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(from air)

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Collection and Field Note Book

No. 71

(Jan. 16, 1964 - Feb. 9, 1964)
(44653 - 45120)

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Book 71

Begin # 44653

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Pacific Vegetation Project
c/o National Research Council
2101 Constitution Ave., N.W.
Washington 25, D. C., U.S.A.

Jan. 16 - Flight - Washington
(Charlottesville) to New Orleans -
inside Boeing 720.

Ground snow-covered.

10:26 Take-off to west or southwest.

Rows of *Juniperus virginiana* conspicuous along roads and fences. About 10% or perhaps more, in patches of woods - mostly deciduous but with many patches of *Pinus virginiana* in the hardwood areas.

These almost all angular patches, occasional diffuse areas of concentration of pine in the hardwood - but the angular patches mostly dense and black.

10:35 maintaining same course, the patches of hardwood become more and more mixed with pine. Now dominantly mixed forest but still with angular patches of pine.

10:35 Visibility poor, then now.

10:57 An extensive and confused mass of mountains, with a very complicated reservoir.

Several larger ranges in middle and far distance.

10:59 Larger mts. just to it. of course.

These mostly covered by deciduous forest. Some pine, mainly angular patches, on lower mts. which have much of forest cleared.

11:00

Larger mts. diverge to it. On both sides of them piedmont type of landscape with much clearing, much deciduous forest, and much pine in angular patches. - perhaps about $\frac{1}{3}$ of each type, pattern very small irregular patchwork (from 31000').

11:13

Mts. are at a considerable distance now.

A high isolated peak just to it, of course in Piedmont.

11:04

A large winding river just s. of this peak.

11:09

Mt. range swings a bit closer.

11:06-09

Small bits of mountain in Piedmont, gradually becoming more numerous and coalescing into a mountainous area, trending toward main range.

11:10

Another large river.

11:19

Capt. mentioned Spartanburg but could not see it.

Many reservoirs. Red soil in extensive cleared land. almost no snow now.

1:02

Appr. landing at New Orleans. Just before end of runway a large area of apparently undisturbed swamp - trees almost touching, standing water. Before that a lake with much aquatic vegetation, mostly submerged and floating, a few bushes

La Cooperativa
Camilo Ponsar.
Enriquez

(rain) (no sun) (all the way)

hitecture in

(10 mi. s.)

ngl.

inians

rees rounded

2. This on high clay soil.

tation is an

crub, Prosopis,

incl. Celtis pallida.

nd some higher

closed forest

of Celtis, with

virginians,

some gum undergrowth of Cordallia, Prosopis, acacia spp.

Sandy areas are in grass.

Great flocks of little brown cranes.

La Cooperativa
Camilo Ponscar.
Enriquez

These mostly covered by deciduous forest. Some pine, mainly angular patches, on lower mts. which have much of forest cleared.

11:00

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11:03

Mts. are at a considerable distance now.

A high isolated peak just to it, of course in piedmont.

11:04

A large winding river just s. of this peak.

11:05

Mt. range swings a bit closer.

11:06-09

Small bits of mountain in piedmont, gradually becoming more numerous and coalescing into a mountainous area, trending toward main range.

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Another large river.

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Capt. mentioned Spartanburg but could not see it.

Many reservoirs. Red soil in extensive cleared land. almost no snow now.

1:02

Appr. landing at New Orleans. Just before end of runway a large area of apparently undisturbed swamp - tree, almost touching, standing water. Before that a lake with much aquatic vegetation, mostly submerged and floating, a few bushes emergent.

1:33

Left New Orleans (rain) ^(no umbrella all the way)

4:02

Left Houston (rain) (Chicken coop architecture in great tracts).

Jan. 16. Hinton (10 mi. e.)

Welder W.P. Refuge.

Quercus virginiana woodland. Trees rounded about 8m tall. This on high ground, dark clay soil.

General vegetation is an open thorny scrub, *Prosopis*, *Condalia*, etc. incl. *Celtis pallida*. In ravines and some higher areas open to closed forest or woodland of *Celtis*, with some *Quercus virginiana*, undergrowth of *Condalia*, *Prosopis*, *Acacia*, etc.

Sandy areas are in grass.

Great flocks of little brown cranes.

Jan. 18 - Welder W.L. Refuge
2 photos near hg. -
Prosopis savanna. - coppice type
mesquite 3-4 m. tall, one live
oak tree. (b+w). Extensive
type here, merging to
live-oak woodland.

3 photos (b+w) of *Condalia*
deciduous than scrub.
near Morby Creek.

2 photos (b+w) of savanna
with a few scattered clumps
of mesquite and *Xanthoxylum*
(?) and very low patches of
mesquite and *Opuntia*
cf. *leptocaulis*, near Lagarto Tanks.

photo (b+w) Aransas R. just
s. of Javelina Bend.

photo along terrace, same
place, *Acacia farnesiana*
open & scrub forest in hg.

subfossil snails
same place.

River terrace forest of
Celtis reticulata, *Elaeagnus*,
Lycium?

Jan. 18 - Welder W.L. Refuge
near headquarters

Scattered *Quercus*
virginiana, patches of
open grass, patches
with open to semi-closed
mesquite brush.

Under the live-oaks
and to some extent under
the larger mesquite bushes
a shrub layer of ~~scrub~~
mostly evergreen usually
springy prickly bushes
of *Xanthoxylum* *pauciflorum*,
Ulmus spinosa, *Berberis* (s.),
Opuntia leptocaulis, *Elaeagnus*,
etc. (photos b+w & bod.)

Also under these trees
green seedlings and
rosettes of *Urtica* *urens*,
Stellaria media, *Parietaria*,
Bowlesia, *Oxalis*, *Geranium*,
etc.

Photo of an "ant yard"
an open space, kept completely
clean, by *Pogonomyrmex* sp. (?)
(large, red.) (b+w. bod.)

Annuals springing up in
great numbers after the heavy
rain on Jan. 15. *Hedyotis*,
Aphlopphus, & *Oxalis* beginning
to flower.

by NK

Jan 18 - Welder Wildlife Refuge
Javelina Bend, Aransas R.
in open to closed scrub
forest, mixed, deciduous
and evergreen

44653 *Celtis spinosa* var. *pallida* (Don.) M.C.

common

54 *Ehretia anacua* (Berl.) P.M. Jtn.
common.

Jan. 18 Welder Wildlife Refuge
Moody Camp
live-oak woodland

55 *Tillandsia recurvata* L.

Jan. 19 - Welder Wildlife Refuge
near headquarters
irregular open woodland
of *Prosopis glandulosa* and *Quercus virgin-*

56 *Zanthoxylum fagara* L.
common in shrub layer under
oak trees

57 *Zanthoxylum fagara* L.
common in shrub layer
under oak trees

58 *Hedyotis caerulea* var. *minor*
rare on open bare soil.

Jan. 19 - Welder Wildlife Refuge
Hackberry Mott, along Aransas River

59 *Phoradendron serotinum* cf. var. *pubescens*
(Engelm.) M.C. Jtn.
parasitic on *Celtis*, in
scrub forest.

shiny shrub 3 m. tall

small tree 5 m. tall

forming balls on twigs
and small branches
of trees.

shrub, 2 m. tall, aromatic
when broken, buds maroon

shrub 2 m. tall, aromatic
when broken, buds bronze-green

flower violet, eye slightly
reddish.

flowers green, trimerous.

Jan. 19. Welder W.L. Refuge
Hatchberry Mott, Aransas R.

A Mott is a scrub forest - in this case a forest of *Celtis* about 10 m. tall, closed or almost so.

Understory of evergreen shrubs - *Gnaphalium*, *Celtis spinosa*, *Condalia obovata*, *Ehretia*, plus some deciduous ones.

Openings + semi-shaded places, if slightly low, are covered by a pure stand of *Aster spinosus*.

Photo of *Tillandsia recurvata*. (kod.)

Pecan Mott - a broad swaly ravine with tall *Celtis*, *Carya illinoensis*, *Ulmus crassifolia* etc. on sides - up to 15 m. (photos) open somewhat grassy bottom. Grassy flats beside it.

Many shrubs in undergrowth.

Cardinal woodcock, thrush, Mocking birds, thrashers, hermit thrush, and swarms of miscellaneous sparrows.

American egret on river.

On upper part of side of ravine a low, almost mat-like layer of *Malpighia glabra* partially covers the ground.

Jan. 20 - Welder Wildlife Refuge

in sect. 44 lot 11. kod. photo of a flock of turkey hens. another of deer.

Near Mesquite Tanks - an open shrub savanna dominantly grass but with scattered *Opuntia lindheimeri* and bushes of low (2.5 m.) *Prosopis*, clumps of *Opuntia leptocaulis*, and small *Acacia farnesiana* with scattered patches of an evergreen to semi-evergreen than scrub of *Berberis trifoliata* with some ~~that~~ *Celtis spinosa* and a little *Opuntia leptocaulis*. This scrub varies from dense to open.

dense
black
clay
soil

A number of photos (6 x 10 + kod. of this and kod. roll) incl views of savanna + of scrub and of some individual plants, incl *Berberis* + *Opuntia leptocaulis* + *O. lindheimeri*.

Jan. 19 - Welder Wildlife Refuge
Pecan Mott, along Aransas River
on flat open roadside,
almost bare soil.

- 44660 *Euphorbia* cf. *serpens* HBK.
common locally
- 61 *Verbena* cf. *bipinnatifida* Nutt.
common locally
- 61a *Leonurus sibiricus* L.?
same - in open to closed forest
- 62 *Diospyros texana*
common
- 63 *Baccharis angustifolia*
~~occasional~~ on steep bank of river
- 64 *Tillandsia usneoides*
common hanging from
branches of trees

Jan. 19 - Welder Wildlife Refuge
Hackberry Mott, Aransas River

- 65 *Amyris texana*
common in undergrowth

Jan. 19 - Welder Wildlife Refuge
Pecan Mott, Aransas River

- 66 *Carya illinoensis*
common in forest in swaly rain

very prostrate, thin mat.
stems reddish.

prostrate, flowers
purple.

sterile shrub, to 3 m. tall.

shrub 3 m. tall, 4 cm. thick
near base, broad leaves on
lower branches, branches
strongly ascending.
pendent

shrub with a somewhat
shunk-like odor when broken.

small tree, 4 m. tall, (others
seen to 15 or more m.).

Jan. 20 - Weldon W. I. Refuge
east of Chico Tank and
Coyote Mill.

A fair sized area of
a grassland with
thickly scattered low
patches of low creeping
Prosopis glandulosa and
Opuntia leptocaulis
Each (or most) clump
of mesquite, 2-5 m.
across, is filled with
a dense growth of *Opuntia*.
The whole 0.5-0.8 m. tall.
Scattered in this are a
few *Opuntia lindheimeri*
and *Berberis*, also a few
Acacia, but these not
very significant.

The grass is mixed very
short and up to 1 m.

Photos (b & w. & Kod. Begon Kod. - 2)

Tule Bend, Aransas R.

Terns with light gray
back, black eye patch
& bright red bill.

Bet.

and Tule Bend a semi-
evergreen open to closed
thorn scrub -

Acacia rigida, *Celtis*
spinosa, *Condalia*
Lycium berlandieri, *Berberis*.

Baccharis? *Yucca*,
Xanthoxylum bagara, etc.

Near Mare Trap Pens
first an enormous old bran
peccary crossed road
and disappeared into thick
thorn scrub. Then 8 medium
sized ones were seen ambling
through thin low thorn scrub.

In La Bolsa the ground
is low and flat. Open
forest of rounded *Celtis*
trees to 4.5 m. tall. Patches
of open *Acacia farnesiana*
about 4 m. With the
large *Celtis reticulata* are
small trees of *Celtis spinosa*.
Large *Opuntia lindheimeri*
common. (photos - b & w & Kod
of this area) Some *Acacia*
rigida.

Tight wire bridge - a
single cable with 2 hand
wires, suspended across Aransas R.
(Kod.)

Patches of *Aster spinosus*,
a leafless broom-like shrub
1 m. tall, in low spots.
(photos - b & w.)

Jan. 20 Welder Wildlife Refuge
Tule Bend, Arkansas R.

in semi-evergreen thorn scrub

X44667 Aster
on bare ^{black} clay soil ^{in depression} along road.

X2 68 Atriplex
common on bare black clay soil
along road

X4 69 Wissadula holosericea (Scheele) Parke
common in very small opening

X2 70 Baccharis
abundant locally

X2 71 Lycium berlandieri
occasional

Jan. 20 - Welder Wildlife Refuge
e. of La Balsa, Arkansas River

X2 72 Aster spinosus
pure stand in low place.

Jan. 20 - Welder Wildlife Refuge

on roadside on dark clay soil

X1 73
common

disk yellow, rays pale lavender

prostrate, gray-green,
stems reddish.

branched at base 0.4 - 0.7 m. tall

shrubs 0.5 - 1 m. tall,

disk greenish yellow, rays white.

rigidly branched

shrub 0.3 m. tall, fruits
turning red.

broom-like, leafless shrub
1 m. tall.

prostrate

Jan. 20 - Welder W. C. Refuge

ravine below Rincón
Tank - area of semi-
evergreen thorn-scrub,
open to closed, with
some small *Croton* trees
in and along edges
of ravine.

Near Lagarto ^{Windmill} ~~Point~~
is an area of minutely
rolling or hummocky
ground - dark clay loam
soil, with patches
of dwarf thorn scrub -
Prosopis - *Opuntia*, &
patches of taller thorn
scrub. small depressions,
no evident pattern
except that the earth
may have accumulated
around the scrub.

Short grass between
the scrub patches, esp.
on the elevations. Mud,
less so in the depressions.
Jack rabbit seen here.

Several groups of 3
little brown cranes flushed
during the afternoon.

Mail - Pine Island
#8 Galapagos Expedition
c/o USS Pine Island
AV
7 PO San Francisco

Jan. 21 - air trip Houston
Texas to Guatemala City.
DC-8, st. side back of wings!
left Houston airport.

10:35

10:38

Cultivated land but
with conspicuous gallery
forest, locally deciduous,
locally evergreen, along
meandering stream.

10:39

Some blocks are pastured,
some cultivated. Much burned
over grassland.

10:41

Mostly dry pasture.

Then salt marsh lining a
coastal lagoon, enclosed
by a barrier beach.

Course turned rt. to follow
coast.

10:43

A shipping canal follows
inner edge of lagoon.

Several small subdivisions
on barrier beach island.

10:44

Visibility almost none.

We seem to be following
the coast just off the barrier
beach.

11:44

Plain, largely but not
entirely cultivated.

several large lakes

11:45

and a large meandering
river with general course
from about 45° to rt of
our course.

11:46

apparently swampy

land along small
meandering stream.
then a large patch of
woods that seems hilly -
several such, with brow
cleared, partly cultivated
land between them.

11:49

Country generally cleared
mostly pasture (brown) but
large irregular angular
patches of forest. Some
hilly areas badly eroded.
Small very meandering
stream at angle, about
 60° back, from course.

11:50

11:51

Country becomes hilly,
but hills mostly denuded.
Fine patchwork of shifting
agriculture. Rugged mts.
in distance.

11:53

Very rugged mts. with
knob-like peaks and deep
canyon-like valleys.
Appears to be last remnants
of a dissected plateau. Highest
areas are forested, slopes
all denuded by shifting
agriculture.

11:54

Sharp ridges with roads
or paths on tops, steeper
slopes wooded, mostly
shifting agriculture.

11:55

Dissected plateau, flatter
part denuded, some peaks densely forested.

- 11:57 Plateau became arid, grass or thin brush, cut by deep jagged canyons, trending back from coast at about 45° .
- 11:59 Plateau mostly pasture, a little cultivation. some very eroded areas, steeper slopes very brushy.
- 12:00 Very rugged mts. seriously eroded, parts are still densely wooded, but only most rugged parts, these with granite pinnacles protruding. Cleared areas are mostly just great erosion scars.
- 12:01 The central basin-like plateau, with a fair sized city. Savanna landscape. Flat cultivated areas. Low mound-like dark hills. Uncultivated areas are mostly grassy with scattered trees. These are the hilly parts. Vast flat valley bottoms are all cultivated.
- 12:04 Thinly wooded low mountain in middle and

- 12:05 far distance to right. Around villages, roads and field boundaries marked by hedges. Landscape tawny.
- 12:06 Areas of green large scale planting (sugar?), brown cultivated land, some orchard (citrus?), pasture with scattered trees. Hedges conspicuous near villages.
- 12:07 Large area of savanna, partly in apparently poor orchards. Then large area of pasture without trees.
- 12:08 Circling for landing. Vast spirally divided ponds - green. What is this? Then apparently saline dry flats with no vegetation - a lake bottom, I guess. Then considerable area covered by water, this very shallow. Continues to near airfield over vast marshes with brown grass and patches of reed, ponds covered by green vegetation.
- 12:12 Landed. In garden at terminal two great *Phytolacca dioica* (?) with enormous swollen bases 2-3 m. across.

1:07

~~from~~ left Mexico City airport.
Circled over large lake
and alkali flat.

1:10

Gentle slopes around it
cultivated, in place terraced

A string of cones with
craters extending to right.

Eroded ash beds almost
like karst at their bases

1:11

Flat area intensively
cultivated the small
fields lined by hedges.

1:12

Higher open forested
country, with many
small cones with craters.
The slopes wooded,
bottoms of craters and
some flat areas between
~~are~~ grassy.

1:13

Flat country, cult.
with mountain
ranges, some rugged.
They thinly wooded.
Valley bottoms flat,
cultivated - green (sugar
cane?).

1:14

Several lakes in distance.
Country generally brown.
High rough mts. beyond
lakes.

1:15

Changed course sharply
to left.

1:16

Hilly denuded country,
hilltops and ridges

generally bare, some brush
in ravines and on steep
slopes. This very extensive.
Ridges generally rather
flat-topped.

This landscape continues
for some time, the contrast
between wood and bare
ridges becoming sharper.
Several wide treeless
valleys separated
by wooded ranges.
Same pattern of bare
ridges and wooded
ravines.

1:25

1:30

1:34

1:35

1:37

Then a large wooded
mountainous area.
Bare eroded hilly
country, reddish-tan,
around a compact little
city.

Low mts. to south of it.
Dark, apparently scrub-
covered. Flat intensively
cultivated land around
them. Mountains irregularly
distributed, becoming
higher, rougher, more
forested. Lower land
cultivated or, where
hilly, eroded.

Valleys smaller & little or
no flat ground, slopes denuded,

summits scrub covered
or wooded.

1:38

Then thinly wooded
mountains, ridges
mostly bare.

Course is now more to
east.

Mountains becoming
more rugged.

1:40

Many cleared patches
on mts. even a village
on a high ridge.

1:41

A stream, mostly dry,
cuts through mts
about perpendicular
to course, conspicuous
light sandy bed.

Then high rugged
mts. more densely
wooded in upper parts.
Lower parts with bare
ridges, thinner woods,
several fires.

1:42

Course follows a stream
bed. These sandy
dry or partly dry beds
stand out against the
brushy slopes.

1:43

Stream empties into a
large lake or reservoir
with three arms.

Mountains around it
with tops denuded,
grassy or eroded.

1:45

Large braided stream
bed from reservoir
parallel course in
middle distance, slightly
diverging from it.

1:46

Stream enters sea
on a strongly cusped
coast, cusps hooked
to left (s.e.?).

1:47

A large lagoon enclosed
by a broad barrier beach.
Back of this a flat
cultivated plain.

Small steep islands
in lagoon.

An arcuate inner
bar almost parallel
barrier beach ~~for~~ almost
full length of lagoon,
connects with a larger
island which is separated
from a mountainous
peninsula by a small deep
channel. Then another large
lagoon. The barrier beach
cut by some shallow channels,
then broadens enormously,
enclosing a series of small
shallow lagoons. Some
shifting agriculture on
this barrier beach, but
mostly brushy. inner side
in places curiously striate,
perpendicular to lagoon shore.

1:51

This merges with a coast with extensive dry lagoons or bare flats, with a wooded barrier beach, then more lagoons. Barrier beach is wide and bushy, with occasional roads from lagoon to sea. Vegetation more or less banded longitudinally. Lagoons become more complicated with numerous small flat islands.

1:53

Then we left coast, out to sea.

2:07

Cut a long straight coast at a very small angle. Beach with large swamp. This pinches out, replaced by flat plain, partly cultivated, partly savanna and abundant patches of forest, mostly very small.

2:11

This plain is quite wide, cut by many streams flowing toward ocean. Now becomes hilly, with more forest, but still largely cleared.

2:12

Gradually more wooded. Clouds.

2:14

A slightly complicated top of a volcano protruding from clouds, wooded to top, but ~~top~~ ^{summit} vegetation a bit thin and scrubby. A grassy area on one side below summit.

2:17

A deep valley with terraces and another steep cone with no craters, wooded to top but not on lower slopes, a deep blue lake.

2:18

Then two perfect cones, again wooded to tops. Lower slopes bare. Plateau with cliffs to lake.

2:20

Deep gorge-like valley then dissected plateau, most of top clear, gorge wooded. Then ahead two much higher cones and a bit to left, another.

2:21

~~to~~ Terrace top cleared, with windbreaks, valleys + steep slopes forested. Then hilly brown country. Another volcano ahead. Most of hilly area clear but some with scattered trees, some patches of forest. Then a dissected mt. and a large area of forest around a town.

2:24

2:25

More wooded mts.
lower slopes clear
with radial wooded
canyons.

Circling to land.

Large irregular volcano,
top apparently blown
out, in distance.

Flat cultivated land.
Lake beyond escarpment.
Some sugar cane.

Flat tops cultivated,
some in orchards.

Ravine walls with
thickets & open scrub.

2:28

landed.

Jan. 21 - flight Guatemala City
to Panama left side of Boeing-

4:15

Took off.

Some open forest - no shade trees
for coffee, on terrace tops. also in flat
canyon bottoms. Some of lower
terrace tops open grassland.

4:17

Steep, almost vertical
walls are wooded.

4:19

Very dissected land, no
flat ridge tops. Slopes largely
wooded, much of wood
could be coffee plantation.

4:20

clouds.

4:21

Valleys V shaped, about 45° slopes,
some bar, mostly wooded,
but rather thinly.

4:22

Hilly country, largely denuded,
many tiny bits of wood.
Where hills are higher
ravines are wooded at
least in bottoms. Country
varies from a reddish

4:24

to grayish-tawny. Much
old erosion, some bedrock
exposed. Soil reddish,
bedrock light gray to buff.

4:25

Perfect little cone with tiny
crater in top. Top 1/3 wooded,
in middle distance, directly
aboard, another, less well
preserved farther away
and a bit back.

4:26

Country a bit more rugged,
small town and considerable
forest between it and course.
Beyond it, ~~also~~ in direction
of course, some curious
very finely dissected country.
Then a series of parallel
ridges and ravines 60° from
course, running to an escarpment
directly on course.

4:29

Country more irregular,
broad valleys, a large very
dissected mt. mass. and
a low smooth cone. Then
some finely dissected land
about 45° thinly wooded. pattern
very fine.

4:32

High abrupt volcano, wooded.

- 4:33 A river crossing course
- 4:35 A clump of volcanoes, wooded, one with a large breched crater with a village in it.
- 4:37 The last one in the clump is a fresh perfect cone with a sharp crater in the top, bare slopes $1/4$ to $1/2$ way down some forest below. This must have erupted recently.
- 4:38 A lake and sharp denuded mountains between it and course.
- Then the ocean - beach straight, at a very slight angle away from course, ending in a peninsula in direction of course, enclosing a bay with many islands. These mountainous, largely bare, but some bushy slopes.
- 4:40 A large volcano on a ~~peninsula~~ with a beautiful hooked spit pointing toward bay. This volcano has a great sharp crater, apparently very fresh, with sharp rim, the outside bay and red, but only for a short distance down, sharp boundary with forest.

- 4:44 Head of bay enclosed by this peninsula is a maze of mangrove-lined tidal channels in an extensive bare flat with about 3 rivers winding through it.
- 4:45 Bet. this and course wooded hills, some peaks bare.
- 4:46 The bare flat extends well up the river, but uppermost reaches look like marsh, rather than bare soil.
- Row of peaks along course look volcanic, but clouds obscure them somewhat. Upper slopes cut by ravines, partly bare.
- 4:47 Clump of small volcanoes, one of them bare and fresh, crater smoking a bit, very sharp. Others still have craters but a bit worn down, some bare or grassy slopes, some wood, on upper slopes, lower part wooded.
- 4:48 A tiny, perfect, dead black cone with a crater. Then several other somewhat larger cones with craters, rawny & partly wooded.
- 4:50 A number of these, and a larger one.

Mearns

- 4:51 bare and red brown ~~at~~ in upper parts - quite fresh. Then complete cloud cover.
- 4:55 Crossed coast. sea is clear but land covered by clouds.
- 4:56 A peninsula, mostly bare but with a small bay with mangrove swamp.
- 5:07 Several small islands out from coast, high, mostly bare or grassy. Land in distance largely brown grass except for some wood or mangrove along shore. Visibility poor.
- 5:08 Coast in distance looks dry.
- 5:09 Small very irregular green island just to left of course. Coast coming closer, but haze rather thick. Some mangrove along coast, especially in bays and around ~~in~~ stream mouths.
- 5:04 Mostly forested land, but visibility very poor. Wooded from here on, becomes
- 5:09 ~~at~~ a bit hilly with a rather fine close pattern. More mountainous in distance. No evidence of shifting apr.
- 5:11 A large river winding off about 45° from course to left, splitting into

- 5:13 distributaries and entering sea through a vast delta. Clouds.
- 5:17 Crossed coast at a very small angle.
- 5:39 Crossed coast again, at about a 45° angle left of course. Getting too dark to see any details.

Jan. 22 - Left Panama 7:00 a.m.
arr. Seymour I. 10:15 a.m. (C130)

Seymour I. - Low cliffs
near harbor. -

Colletia sp. occasional on
rocks and talus. A green
almost leafless *holacanthus*
dense low diffusely branched shrub.
Also common a brown spiny
spiny leafless bush,
a *Ceanothus* (?), and a shrub
with fleshy alternate
leaves minute green fls.
with prominent disk in
axillary pulvini, a single
individual of what
appears to be a *fatouha*,
occasional antherscent *Opuntia*.
a few small *Parhinsonia*
aculeata. much completely
dry grass. Lichens on
several of the shrubs.
Rock is a volcanic breccia.

Tidal flat back of
beach - silt with considerable
sand blown in on it.

Parhinsonia aculeata scattered
Commicarpus?

Sesuvium portulacastrum
The *Sesuvium* forming
small mats in wet silt. The
Commicarpus mats & low tangles

slightly higher up.
The *Parhinsonia* on sand
blown in, probably seldom
covered by tide.

Beach ridge across head
of bay.

Heliotropium curassavicum
holding hummocks of sand
near one end. *Coldenia* sp.
dead, also common.

In center of beach,
a ~~the~~ *Hippomane* bush,
the thick leaved *Celastraceae*
fairly common, also
Commicarpus and *Colletia*
near center of head of
bay, and extending
along boulder ridge toward
other side.

Beyond center is a remnant
of what looks like elevated
deep, perhaps 2 m. above l.t.
surface very pitted and
sharp. Much volcanic
rock included, so it
may well be beachrock.
Very difficult to break.

The remnant is about
78 ft (25 m) long and
much eroded; gray color
(sample 1).

Another piece of obvious
beachrock, felled, differing somewhat
in rock (white?)

Curlew, golden plovers?,
Brown pelicans, frigatebirds
minors, sea lions

Dozens of green turtle (?)
holes on sandy beach
ridge.

Flight Seymour to Academy
Bay - Broad plain on Santa
Cruz covered by a somewhat
open forest of *Bursera*?
completely bare, branches
white. A few trees rather
inland are beginning to
turn green.

Another zone dominated
by *Psidium*, and one
dominated by *Leucaena*.

On the slope ~~of~~ above
Academy Bay several
clearings and dwellings.

Opuntia in all the types
except the *Bursera* zone.

Around Academy Bay
Village *Croton* is
dominant shrub.

Academy Bay

Exotic plants

Ricinus communis

Ficus carica

Carica papaya

Catharanthus roseus

Passiflora foetida n. hispida

Annona cherimolia

Phoenix dactylifera

Mercurialis indica

Terminalia catappa

Bougainvillea spectabilis?

Aloe sp. of vera.

Cynodon dactylon

Sorghum

Hibiscus hybrid

Canas hybrid

Portulaca grandiflora

Mesembryanthemum

Solanum lycopersicum

Pelargonium zonale

Agave.

Sonchus

Amaranthus

Vitis vinifera

Rhoeo spathacea

Datura (*Brugmansia*) sp.

Plantago

Momordica charantia

Ruellia cf. *longiflora*

Cucumis melo

Caesalpinia pulcherrima

Yucca sp.

Jan. 22 - Seymour Island

~~along~~ around bay where
sea plane ramp is located
44674 *Maytenus octogona* (L'Her.) DC. det. D.M. Porter 11/12/69
Maytenus obovatus

1 common on beach ridge
5 75 *Maytenus octogona* (L'Her.) DC. 11/12/69
Maytenus obovatus Hook. f.
~~common~~ occasional on
low volcanic cliff.

5 76 (lichen)
on twigs of bare bush
77 ~~lichen on twigs of bare bush~~

5 77 (lichen)
on twigs of bare bush

78 ~~Caesalpinia~~
5 78 *Parinsonia aculeata* L.
common on flat just
above high tide

5 79 *Sesuvium portulacastrum* L.
(very local on tidal mud flat)
Sesuvium Edmonstonei Hook. f. Det. D.M. Porter, 1975.

5 80 *Cryptocarpus pygmaeus* HBK.
abundant locally,
on tidal flats (also seen
on higher rocky ground
and on sand)

1.5 m.



shrub 3 m. tall, densely
branched; flowers green
irregularly branched
bush, leaves stiff,
fleshy, brittle; flowers green.

shrub 3 m. tall, widely
spreading, flowers
yellow.
forming dense mats,
stems green, leaves fleshy,
dull, not strongly
compressed, erect,
flowers pink.
spreading fleshy shrub,
flowers greenish.

Jan. 23 - Academy Bay
~~Low~~ Tangled scrub of
 Cryptocarpus and many
 other shrubs, with
 scattered tall Opuntia
 on flat ground back
 of high tide line.

When the ground
 begins to slope upward
 this is immediately
 replaced by a taller
 scrub, 3-5 m. tall, of
 Croton sp., Opuntia,
 Acacia, Cryptocarpus,
 Cereus, Colletia, ~~Castela~~ Maytenus

Little undergrowth and
 almost no herbs. This
 is on bare lava, very
 little soil even in pockets.
 Boerhavia, Portulaca are
 occasional.

Cordia lutea and Valleria(?)
 are occasional.

The Croton is just starting
 to put forth new leaves.

On rather lower lava
 near the fault scarp
 Cryptocarpus seems
 dominant, with few
 deciduous species. But
 the scrub is definitely
 open with the black
 lava showing between

the trees when looked at
 from the top of the scarp.
 Cereus is more abundant
 here than Opuntia, but
 the latter is still common.
 3 photos (Brew) from cliff top.

Precipice of lava
 dominated by
 Cryptocarpus, but
 with Croton, Bursera,
 Opuntia, Prosopis, Castela

Polypodium and Pityrogramma
 rare in crevices.

Lichens abundant
 on rocks and ~~in~~ on rocks.
 Prosopis

On top is a lava flat
 with some red soil in
 pockets. This is covered
 by a scrub about 3 m. tall

of *Croton* just leafing out, with scattered *Opuntia* to 6-7 m. and *Bursera* to 5 m. just leafing out.

Some *Castela* & *Maytenus*. The *Croton* is spaced 1-2 m. and ~~plants~~ stems to 3 cm. diam.

Locally *Parkinsonia* & *Cordia*. In some open places patches of an intricate shrub (*Molpige*?). *Acacia*. Also goat-trimmed dwarf shrubs of an acaesmiac *Lantana* sp. in open places.

A seedling *Sporobolus* & seedling legume (phaseolid) and *Evolvulus* common on ground esp. in crevices. Much dead wood.

Farther in, where ground slopes up again, *Bursera* is dominant - deciduous scrub forest about 5 m. tall with liberal component of *Opuntia* and some *Cereus* the same height. Much dead wood.

Jan. 24 - Academy Bay.

Lowland scrub - dominated by *Cryptocarpus* which forms tangles up to 3+ m. deep. The clumps are from 1 to 3 m. apart, many stems and branches, these to 5 or more m. long, forming a continuous tangle. Mixed with this are scattered tree *Opuntia*, large shrubs of *Maytenus*, occasional bushes of *Colletia*, *Castela* (spineless), *Froelichia*, *Alternanthera*, and very commonly, tall tree-like shrubs of *Croton scouleri*, these 3-4 m. tall, irregularly distributed.

Locally there are groves of *Opuntia*, and just back of the mangrove, groves of *Hippomane*. The *Cryptocarpus* tends to climb over the *Hippomane* and form large mounds.

Jan. 23 Academy Bay
vicinity of Geomorphological Station
in open scrub forest
on basaltic lava ^{rock}
occasional in very
sparse undergrowth
on lowest slope, below
escarpment

44681

Vallesia glabra (Cav.) Link. ^(det. Andersen 1978)

5

5- 82

Prosopis dulcis Kunth
(occasional on cliff
P. juliflora (Sw.) DC.

5

83

Castela glauca Hook. f.
~~rare~~ rare on cliff

5

84

Polypodium tridens Kunze det. Porter 1974
rare in crevices on cliff

5

85

Commelina diffusa Burm. f.
occasional on upper
ledges of cliff

1

86

Boerhaavia scandens L.
occasional on ledges of cliff

1

87

Roevelia
local under overhanging
rocks on cliff

5

88

Bursera graveolens (HBK.) Tr. & Planch. det
occasional on cliff

1

89

Malpighia?
local
occasional in open scrub

1

90

Lantana?
common in more open areas

10-20 m.



elongate, semi-scandent
lactiferous shrub, corolla limb white,
ripe fruit white, fleshy

det. Porter

spreading, diffuse
shrub, flowers dull
cream, pods immature,
~~semi-scandent~~
small tree with arching
semi-scandent elongate
branches.

det. Porter

rhizome prostrate,
much branched, stipe thick,
yellow when broken,
prostrate, ~~st~~

D. M. Porter
1970

small tree, scarcely
leafed out, fruit immature,
sterile, intricately branched
shrub, herbage with a
slightly shrubby odor when broken.
aromatic, sterile, shrub
eaten down by goats.

44691 *Croton scouleri* Hook. f. var. *scouleri*
~~in~~ det. D.M. Porter 1974

1 92 *Cordia lutea* Lam.

occasional in inner

5 93 *Evolvulus* ~~in~~ more open part of terrace
 common locally in
 crevices and pockets of
 soil

5 94 *Croton Evolvulus glaber* Spreng. (Det.
 D.M. Porter) common on inner
 part of terrace

5 95 *Acacia macracantha* H. and B. ex Willd.
 common on inner
 part of terrace in more open areas

6 96 *Boerhavia scandens* L.
 common generally
 in crevices and pockets
 of soil

2 97 *Boerhavia caribaea* Jacq. Det. D.M. Porter 1975.
 rare in pockets of soil

1 98 *Desmodium* ^{Procumbens (Mill.) Hitchc.}
 var. *Procumbens*
 occasional in pockets of
 soil, in clearing.

5 99 *Portulaca oleracea* L.
 common in clearing.
 rare in pockets of
 soil in scrub

shrub 1.5 m, tall.

prostrate

shrub 3m. tall.

44694: *Croton scouleri* Hook. f. var. *scouleri*
 det. D.M. Porter 1974

flat-topped tree 4 m.
 tall, flowers orange.

young shoots from
 heavy rootstocks,
 flowers pinkish.

prostrate, leaves
 somewhat in one plane,
 fleshy.

Jan. 24 Academy Bay
in lowland scrub
just back of mangrove zone.

44700

Tournefortia pubescens Hook. f. (Det. P. M. Porter)
very local

5

5

01

Heliotropium curassavicum L.
locally common in
openings

12 Det. P. M. Porter 1975
02

~~*Boerhaavia*~~ *Alternanthera filifolia* (Hoo Kf.) Howell
common in openings

- same - in edge of
mangroves

5

03

Avicennia germinans (L.)!
rare det. Moldenke

5

04

same - in scrub on lava rock
Maytenus octogona (L. Her.) DC. det. D. M. Porter 10/12/69
Maytenus ovata Hook. f.
occasional

5 Det. P. M. Porter 1975
05

Cryptocarpus pyramidalis HBK. HBK
abundant, dominant

5

06

Acacia imulata-jacobi Rides
rare, on lava ridge

5

07

Colletia Scutia pauciflora (Hook. f.) Weberb.
common

5

08

Alternanthera echinocephala
common

5

09

Tournefortia pilostachya HBK (Det. P. M. Porter)
rare

1-2 m.

Porter

shrub to 2 m. tall,
flowers white, fruit white, fleshy.
very glaucous; flowers
white, eye greenish yellow.

0 m.

much branched, green-
stemmed, suffrutescent,
up to almost 1 m. tall.

small tree, 4 m. tall,
leaves somewhat glaucous
beneath.

1-3 m.

↓

shrub 3 m. tall, leaves
thick, flowers green.

brittle, fleshy scandent
shrub, forming tangle.

shrub 2-3 m. tall spreading,
flowers deep orange yellow
fragrant

det. Porter

low rigidly and intricately
branched shrub, flowers yellow-green
suffrutescent herb 2 m. tall
heads dull white.

P. M. Porter

shrub 2 m. tall
with drooping elongate
branches, white flowers.

Jan. 24 - Academy Bay
mangrove zone.

Flora

Rhizophora mangle L.

Avicennia officinalis L.

Laguncularia racemosa (L.) Gaertn.

Conocarpus erectus L.

Spartina

Sesuvium portulacastrum L.

Sporobolus virginicus

(L.) Kunth

~~Flora~~

The mangroves here grow on bare basalt rock where it slopes or forms terraces covered at high tide. Silt and sand accumulate around their roots wherever there is rock debris to hold the mud. Along much of the shore in front of the mangroves are accumulations of broken rock with sand and silt covered, back of the crest, by *Sesuvium* and *Sporobolus virginicus*. The seaward slopes of these boulder ridges are

inhabited by marine iguanas.

The mangrove fringe is generally quite narrow. Locally *Laguncularia*, locally *Avicennia* dominant, with some admixture of *Rhizophora*.

Jan. 24 - back of Academy
Bay, beginning of
trail to ^{Bella Vista} Hornemann farm.

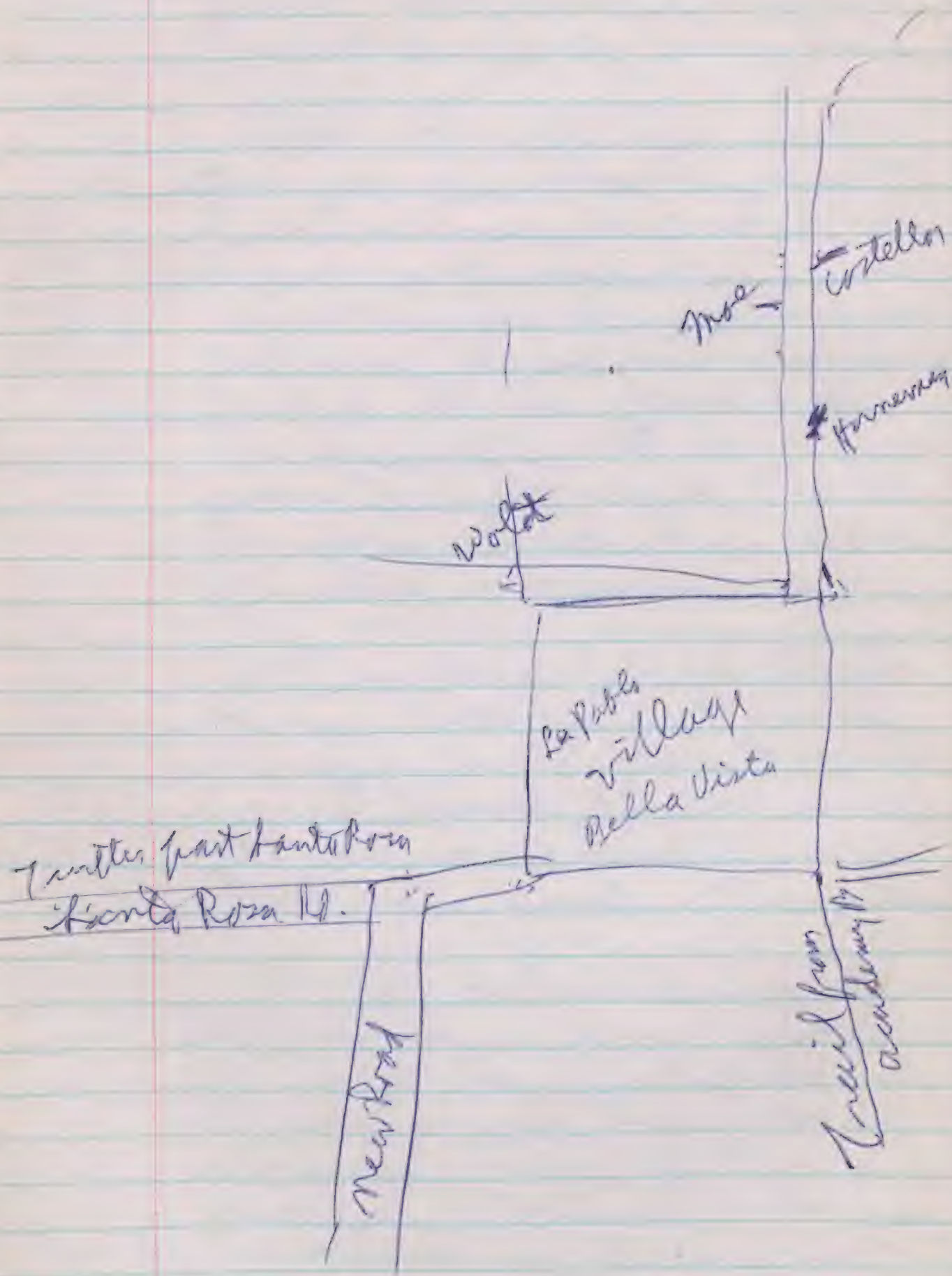
Open mixed scrub
openness probably result
of clearing - cut trees
and stumps present -
Discaria, Cryptocarpus,
Valleria, Acacia 2 spp. ^{Zanthoxylum} un
Cordia lutea, Cordia sp.
Tomnepatia, R. with
scattered trees - Pisonia,
Bumelia, Piscidia, Acacia,
Opuntia, Parkinsonia (n.)

Castela

Where this has not
been cleared it is an
irregular - open to closed
scrub ~~forest~~ forest, with
the same composition
but also with Maytenus

In the cleared area,
in crevices and pockets
of soil Brehania hirsuta,
B. scandens, Trianthema
setaria, Passiflora
foetida, Portulaca oleracea,
Ipomoea sp., Galactia?
Abutilon sp. are all common

Cryptocarpus is spreading
over this, thinly now.



Exotic plants at Bella Vista

- Pritchardia pacifica*
- Cocos nucifera*
- Dillenia indica*
- Eugenia jambos*
- Musa sapientum*
- Sida rhombifolia*
- Coffea arabica*
- Hibiscus* cf. *rosa-sinensis*
- Datura* (*Brugmansia*) (salmon color)
- Tectona grandis*
- Malvostium coromandelianum*
- Eugenia malaccensis*
- Ananas comosus*
- Carica papaya*
- Ipomoea batatas*
- Cyperus alternifolius*
- Persea americana*
- Tropaeolum majus*
- Rosa* spp. (ornamental hybrids)
- Priva aspera*?
- Salvia occidentalis*?
- Nicotiana tabacum*
- Nerium*??
- Terminalia catappa*
- Jatropha curcas*
- Capricorn frutescens*
- Bomarea*
- Sida acuta*
- Verbena littoralis*
- Elephantopus spicatus*
- Paspalum conjugatum*
- Cyperus brevifolius*
- Momordica charantia*

Delonix regia

Jan. 24 - Academy Bay
lower part of trail to ~~Atahualpa~~ ^{Bella Vista}
in xerophytic scrub on
bare lava rock

44710 *Clerodendrum molle* HBK.

1 rare

1 11 *Boerhavia scandens* L.
common

1 12 *Capraia biflora* L.
occasional along trail.

1 13 *Sida spinosa* (det H. Andersen 1978)
occasional along trail

5 14 *Heliotropium angiospermum* Murr. (det. D.M. Porter) rare, not far from shore

5 15 (grass) *Setaria setosa* (Sw.) Beauv. det. D.M. Porter 1974 occasional in open areas

3 16 *Plumbago scandens* L. (det H. Andersen 1978) occasional in open places

2 17 (legum) *Galactia velutina* Benth. occasional in open places

1 18 *Ipomoea*
rare in open places

5 19 *Trianthema portulacastrum* L.
common in open places
in pockets of soil.

5 20 *Passiflora foetida* L. var. *galapagensis* Killip det. Porter common in disturbed places

5 21 *Abrutylon deparparatum* (Hook. f.) Anders. ex Rob. (det. P.M. Porter) common in open places

8 22 *Pisonia floribunda* Hook. f.
one tree seen

5 23 *Cordia*
rare

10-20 m.



scandent shrub; sterile.

elongate herb, leaves
green beneath

dwarf shrub.

erect tufts

flowers white.

twining over bushes

flowers rose purple, closing
in late afternoon.
leaves thin, fleshy.

prostrate and climbing
stems from central root
crown.

flowers pale
orange, petals
narrow, separated.

Tree with strongly ascending
branches, fruit from ground.

58 1964 Galapagos I.

- 44724 *Acacia macracantha* H. and B. Willd.
common
- 2 25 *Valleria glabra* (Cav.) Lint. (det. Andersen 1978)
common
- 1 26 *Tournefortia pubescens* Hook. f. (Det. D.M. Porter)
occasional
- 1 27 *Acacia insularis-jacobi* Ridley
common
- 1 28 *Tamarindus*? *Prosopis juliflora* (Sw.) DC.
rare, near dwelling
- 1 29 (legum) *Piscidia carthagenensis* Jacq.
common
- 2 30 *Chiococca alba* (L.) Hitchc.
occasional
- 1 31 *Valleria glabra* (Cav.) Lint. (det. Andersen 1978)
common
- 5 32 *Procravia caribaea* Jacq. Det. D.M. Porter, 1925
very common on bare lava rock, especially in open places.
- 8 33 *Cordia lutea* Lam.
common
- 1 34 *Cryptocarpus*
abundant

Jan. 25 - Academy Bay
on muddy flat just back
of rocky shore, wet by
sea water at high tide

- 6 35 *Sporobolus virginicus* (L.) Kunth
abundant

Indefatigable (Santa Cruz) 59?

- small spreading
- flat-topped tree; flowers orange.
shrub 2 m. long, spreading,
lactiferous; flowers white.
- shrub 2 m. tall;
flowers white.
- shrub 2.5 m. tall.

- small tree 3 m. tall, nearly
flat topped.
- shrub 2 m. tall (others
seen tree size); sterile.
- shrub 2 m. tall.

weak shrub; flowers white.

- branched from base,
branches ascending,
branched in one plane.
- shrub 3 m. tall,
corolla bright yellow,
ripe fruit white, fleshy.
specimen to show
rooting of prostrate stems.

1 m.

forming a thick sod.

Jan. 25 - Trail to Horneman Farm from Academy Bay, near ~~La Bahana~~ ^{Point Santa Chica}
 open & closed scrub forest on lava - much *Opuntia* (photos bot. & w.)

This seems to be about the beginning of the *Bursera* forest. It would be an open scrub forest about 3 m. tall, mixed *Bursera* and *Opuntia* with a denser tall scrub layer of *Zanthoxylum*, *Croton*, *Opuntia*, *Colletia*, etc. *Alternanthera echinocarpa* and a sparse layer of *Abutilon*, *Cryptocarpus*, *Ipomoea* spp., *Portulaca*, *Setaria*, *Amaranthus*, *Boerhaavia scandens*, *Alternanthera echinocarpa*, etc.

Beyond the ~~La Bahana~~ ^{Point Santa Chica} the forest becomes a bit denser. (Photos bot. & w. Red)

One *Opuntia* about 28" tall measured, dbh 13 cm girth b.h. v.
 Acacia common. Shrub layer not so prominent. Tree layer more irregular denser.

Above precipice called La Bahana the forest becomes closed and taller up to 12-15 m.

Still some *Opuntia*. *Usnea* draped over some trees.

(photos - bot & w.)

From top of precipice to Hornemann place (at 600') the vegetation gradually assumes a more and more mesophytic aspect, becomes denser, less species are deciduous, composition becomes richer, *Pisonia* becomes abundant, *Opuntia* disappears.

Around Bella Vista the vegetation is degraded and disturbed, mostly a tangled secondary scrub.

Jan. 25 - trail from Academy
Bay to Bella Vista (La Fortuna)
near first large fault crack
in open scrub-forest,
~~on the~~ in pockets of soil
and crevices in lava rock

44736

Ipomoea

occasional

1

37

Heliotropium angiospermum Muir. (Det. D.M. Porter)

occasional

1

38

Fleurya aestuans Gand.

rare in crevices

5

39

Ipomoea

common

1

40

Mentzelia aspera L.

rare in crevices

#

same between the two
faults.

in open scrub forest on
lava rock.

5

41

Acacia xerodimiana Christoph.

occasional

5

42

Malvastrum coromandelianum

common locally in pockets of soil.

1

43

Chiococca alba (L.) Hitchc.~~shrub 1.5 m. tall~~

3

44

Croton scouleri Hook. f. var. *scouleri*~~shrub 1.5 m. tall~~ common

2

45

Amaranthus

occasional in pockets of soil

1

46

Leptocarpus pauciflorus (Hook. f.) Weberb.

common

25 m



creeping, flowers pink.

flowers white, with
yellowish eye.

creeping, flowers white.

40-50 m

small spreading tree
4 m. tall, flowers orange,
fragrant.

shrub 1.5 m. tall.

shrub 1.5 m. tall

Det. D.M. Porter 1974

shrub 0.7 m. tall, stems
green, stiff.

44747 *Sida spinosa* L.

1 occasional

5 48 *Panicum fasciculatum* Sw. det. D.M. Porter - 1974
common2 49 *Boerhaavia caribaea* Jacq. det. D.M. Porter - 1975
common5 50 *Euphorbia* *Chamaesyce ophthalmica* (Pers.) Burch (det. H. Andersen 1978)
common locally1 51 *Chiroccia alba* (L.) Hitchc.
occasional1 52 *Heliotropium angiospermum* Murr. (Det. D.M. Porter)
common5 53 *Heliotropium angiospermum* Murr. (Det. P.M. Porter)
~~is~~ rare variant5 54 *Plumbago scandens* L.
occasional, in full sun.1 55 *Cyperus*
rare, in crevices in lava2 55a *Cenchrus platyacanthus* Anders. det. D.M. Porter 1974
occasional
same - near foot of precipice5 56 *Tournefortia pubescens* Hook. f. (det. H. Andersen 1978)
rare5 57 *Tribulus cistoides* L.
rare, in full sun3 58 *Capraia biflora* L.
common in trail1 59 *Justicia*
rare5 60 *Tournefortia pubescens* Hook. f. (Det. P.M. Porter)
occasional

spreading tufts

spreading to prostrate,
flowers deep rose.erect shrub 1.5' m. tall,
buds white.flowers white,
eye yellowish.loosely branching
branches ascending,
flowers white.plant prostrate with
ascending branches,
deep purple; petals white,
rather narrow.

spreading culms,

culms ascending to erect.

shrub 1.5' m. tall,
flowers white.prostrate, stems
radiating from rosette.
flowers white.shrub 2 m. tall;
flowers white.

- 44761 *Tournefortia rufo-sericea* Hook. f. (Det. D.M. Porter)
5 occasional

5 Det. Porter 1975
62

- Alternanthera halimifolia* (Lam.) Standl.
rare at this altitude

- 10 63 *Alternanthera filifolia* (Hook. f.) Howell.
locally common

Jan. 26 - trail between
Bella Vista and abandoned
village of Lince Enrique
disturbed mossy forest

- 5 64 *Asplenium* feel Kunze ex Fee Det.
epiphytic

- 1 65 *Conyza canadensis*
in weedy clearing

- 3 66 *Lonchocarpus*
in weedy

- 2 67 *Nephrolepis cordifolia* (L.) Presl det. Porter 1974
on fallen log

- 5 68 (comp.) *Adenostemma laevigatum* (L.) Kuntze
occasional along trail

- 5 69 *Psychotria infipera* Hook. f.
abundant in undergrowth

- 1 70 *Eleocharis acicularis* Gand.
common along trail

- 3 71 *Urera caracasana* (Jacq.) Griseb. (det. Andersen 1978)
rare in undergrowth

- 2 72 *Cordia*
rare in undergrowth

- 2 73 *Cordia*?
rare (to 11-74)

shrub 1.5 m. tall,
flowers white; ripe
fruit white, fleshy.
plant spreading,
depressed.
much branched.

600'

700 m.

H. v. d. Werff.

V

flowers yellow.

large much branched
herb with thick stem, 0.7 m. tall
flowers white

det. Porter

shrub with green stem,
1.5 m. tall, fruit red, fleshy
flowers white

stinging herb, stems
reddish.

shrub 2 m. tall, sparsely
branched, inflorescences
on bare stems below leaves

shrub 2.5 m. tall

tree 4 m. tall, gnarled.

Jan. 26 - trail between
^{Carrizo}
^{La Cooperativa} ~~La Bella Vista~~ Bella Vista and
 Ponce Enriquez (abandoned
 colony).

The general vegetation
 is a degraded *Scalesia*
 forest, quite open, the crown
 touching only in places.
 Some areas have a strong
 admixture of *Psidium*
galapagense and *Zantho-*
oxylum fagara, or only
 the latter, in places
 dominant, with either
 few or no *Scalesia*. The
 trees are 10 m. or more tall,
 especially the *Scalesia*.
 The *Scalesia* have
 straight bare trunks
 and an umbrella-shaped
 crown, fully leafy. The
Zanthoxylum and the
Psidium are gnarled,
 diffusely branched and
 spreading, sparsely
 leafed, and covered by
 festoons of a hanging
 dark brown moss. Here
 and there are cleared places.

The whole has a deep
 layer of herbaceous
 or subshrubby undergrowth,
 this thick and about 2 m. or
 more tall.

The ground is a dark
 soil, deep in pockets,
 rock showing through
 in others. ~~the~~

This vegetation seems
 to have suffered from
 the degradations of
 log cutters, wild cattle,
 wild hogs, donkeys, etc.

Apparently this herbaceous
 undergrowth appears
 very rapidly in the
 wet season, and
 dies to the ground in
 the dry season (except
 probably the abundant
Psychotria).

~~Jan. 26~~
 Jan. 26 - trail between
 Ponce Enriquez and
 "Table Mountain" (Los
 Negritos).

This runs through
 less disturbed forest,
 partly an extremely
 mossy *Psidium*-
Zanthoxylum open
 gnarled forest with
 a deep herbaceous
 + sub-shrubby under-
 growth. The trees are
 spreading and not
 very leafy, spaced

up to the ~~length~~ width of the crowns, in places the crowns touching.

Parts of this trail are through areas of *Scalesia* forest varying from open to closed. The trees tall, bare to the umbrella-shaped crowns, which are light green.

Areas where the *Scalesia* has been cut or destroyed in some way are producing thick crops of *Scalesia* saplings.

The *Xanthoxylum* and *Psidium* are swathed in masses of hanging moss, yellow-green to dark brown. The undergrowth is from 2 to 3 m. deep. *Psychotria* is very common. The rest is of fast growing herbs. (photos)

Near the grass-topped hill called Table Mountain are rather extensive open meadows, with intricate series of low rolling hummocks with shallow pools of water between them - the

hills and depressions covering about half and half of the ~~area~~ open areas. The grass seems to be largely *Stenotaphrum secundatum* or some similar wide-leaved stiff low grass, some *Paspalum conjugatum*, and abundant sedges - *Eleocharis*, *Dichromena*, *Cyperus*, etc., also abundant *Alternanthera* (reddish, pubescent), and *Cuphea carthagenensis*.

The water is mostly covered by a thick layer of bright red *Azolla*.

This is the "Tortoise Country" of Swenson. Several large tortoises were seen, grazing on the grass and herbs. (photos)

It is surrounded on the side away from the hill by *Scalesia* forest (photos) and on the side toward the hill by a scrub of *Erigeron* sp.?, forest of *Croton* sp. which extends up the hill, and *Scalesia* forest. Top of hill is grassy. (photos)

The "Tortoise country" is rather extensive and usually in long, rolling openings, with *Scaevola* forest and *Psidium* between them. This combination extends north or northwest to a tremendous collapse crater several hundred yards across and 400-600 ft deep. Upper walls are vertical, talus below. A grassy spot occupies the center of the bottom, and thin forest the talus and such parts of the side as are not quite vertical. (photos).

Bella Vista -
exotic plants

Ochroma pyramidali
Panicum maximum
Cymbopogon nardus
Colosasia esculenta
Manihot ~~esculenta~~
Xanthosoma sagittifolia
Jatropha curcas
Codiaeum variegatum
Rambusia mexicana
Ricinus communis
Solanum tuberosum
Saccharum officinarum
Bambusa
Gymnocallis littoralis
Ipomoea batatas
Eclipta alba
Panicum purpurascens
Psidium guajava
Eleusine indica
Mangifera indica
Inga sp.

(ctd. from p. 66)

- 44774 *Solanum nigrum* L.
 3 common in ~~at least~~ clearing
 7 75 *Asplenium auritum* var. *auriculatum*
 epiphytic
 1 76 *Polypodium steirolepis* C. Chr. det. Porter
 epiphytic
 3 77 *Pleuropetalum derwinii* Hook. f. det. H. v.d.
 occasional along trail
 6 78 *Galium galapagoensis* Wigg.
 very local, one tangled
 colony in old clearing

Jan. 26 - Trail between Once
 Enrique (abandoned village) and
 "Table Mountain" (Los Negritos)
 "Tortoise Country".

in ~~at~~ rather degraded
 mossy ~~forest~~

- 2 79 (fern) *Dennstaedtia globulifera* (Poir.) Hieron
 occasional
 1 80 *Nephrolepis cordifolia* (L.) Presl det. Porter
 epiphytic
 2 81 *Spermacoce suffrutescens* Jacq. (det. H. Andersen 1978)
 abundant in herbaceous
 undergrowth
 5 83 *Phoradendron*
 common, parasitic on
Zanthoxylum paza (L.) Sarg.
 2 84 (solan.)
 rare
 2 85 *Solanum nigrum* L.
 common ~~in~~ along trail
 2 86 *Spermacoce suffrutescens* Jacq. (det. H. Andersen 1978)
 common in trail

much branched sprawling
 herb, flowers white.
 (Hook. f.)
 Morton & Lellinger det. Porter.

1974

Werff.

det. Porter

shrub 1 m. tall; inflorescence
 red, calyx orange.
 tangled mass, sterile;
 (could have come from RioBamba
 with colonists).

200 -

260 m

det. Porter

fronds almost erect, 2 m.
 tall, from erect rhizome.

1974

stems red, flowers
 white.

stems erect, 1 m. tall, several
 from base; fruit white,
 translucent.

shrub 1 m. tall, buds
 white. fruit immature.
 much branched herb,
 flowers white.

with # 44781, but corolla half as
 large, stems green, flowers white.

- 44787 *Polypodium lanceolatum* L. det. Porter 1974
epiphytic
- 5 88 *Solanum nigrum* L.
rare along trail in opening
- 6 89 ~~*Meconium*~~ *Meconium dianthera* (Sw.) Pennell
abundant along trail
- 5 90 *Chiococca alba* (L.) Hitchc.
rare
- 3 91 *Epidendrum spicatum* Hook. f.
~~common~~ rare, epiphytic
- 5 92 *Jaegeria crassa* Torres det. Porter
abundant along trail
- 1 93 *Asplenium cristatum* Lam. det.
terrestrial
- 4 94 *Pilea baurii* Robins (det. H. Andersen) 1978
common
- 2 95 *Psychotria rufipes* Hook. f.
abundant in undergrowth
- 4 96 *Doryopteris pedata* var. *palmata* (Willd.)
common, terrestrial
- 5 97 *Psychotria rufipes* Hook. f.
abundant in undergrowth
- 5 98 *Psychotria rufipes* Hook. f.
abundant in undergrowth

Jan. 26 - "Tortoise Country"
near hill called "Table Mountain"
or "Los Negritos"
in ~~an~~ open meadows
with wet depressions

- fronds leathery
- det. Porter - much-branched compact
bushy herb, m. tall
flowers white.
- det. Porter - prostrate, flowers yellow.
said to have been recently
introduced but to have
spread very rapidly.
- det. Porter - shrub or small tree 4 m
tall, branches elongate,
subscandent.
flowers yellowish,
mostly seen fruiting
flowers yellow.
- Porter - stems thick, translucent,
juicy, edible.
shrub 1.5 m tall, flowers
white.
- Hicken det. Porter 1974 - shrub 2 m. tall, flowers
white, fruit red, fleshy.
shrub 1.5 m. tall, flowers
white, fruit immature.

275 m.

- 44799 *Dichromena* Rhynchospora nervosa subsp. ciliata
 5 common (M. Vahl) T. Koyama det. D. M. Porter 1974
- 3 800 *Ageratum conyzoides* L.
 abundant
- 2 01 *Spilanthes acmella* (L.) Murr.
 occasional
 in edges of wood.
- 5 02 (malv.) *Anoda xacavifolia* DC. (Det. D. M. Porter)
 common
- 5 03 (cucumb.) *Elaterium carthaginense* Jacq.
 common in edges of woods.
- 2 04 *Phoradendron henslowii*
 parasitic on *Croton* sp.
- 2 05 *Croton scouleri* var. *grandifolius* Muell. Arg.
 common around meadow,
 abundant on hill above.
- 2 06 *Cuphea carthagenensis* (Jacq.) Macbr.
 abundant locally
- 2 07 *Erigeron* ?
 dominant in scrub around
 meadow
- 3 08 *Spermacoce*
 common, growing in scrub
 around meadow
- 1 09 *Ligna luteola* (Jacq.) Benth.
 common
- 2 10 *Cassia sophera* (L.) Roxb. det. Barnaby 84
 abundant locally
- 1 11 *Cyperus rivularis* ssp. *lagunetto* (Steud.) T. Koy.
 common in wet places
- 1 12 *Cyperus brevifolius*
 common in wet places
- 2 13 *Eleocharis nodulosa* (Roth) Schult. det. D. M. Porter 1974
 abundant in wet places

- tufted; bracts white.
- aromatic herb, flowers
 purple.
 disk white.
- tangled herb,
 flowers white.
- det. H. v. d. Werff Tangled; flowers yellow-
 green, fruit immature.
- det Porter 1974 tree 5 m. tall, aromatic
 when broken.
- det D. M. Porter plant reddish, flowers
 magenta.
 Dec. 1969 shrub 1 m. tall,
 compactly branched; sterile.
- stems reddish; flowers
 white.
- creeping and twining
 in grass, flowers yellow,
 keel not twisted.
- shrub to 0.5 m. tall;
 flowers orange-yellow.
- det. Koyama 1974 heads green.
- Porter 1974 tufted

- 44814 *Azolla microphylla* Kauts. det. Porter 1974
 5 abundant on ^{small} ponds, floating
 1 15 *Digitaria horizontalis* Willd. det. D.M. Porter 1974
 common
 1 16 *Oxalis corniculata* L.
 common
 4 17 *Drymaria cordata* (L.) Willd.
 very common
 1 18 *Lobelia xalapensis* HBK. (det. Andersen 1978)
 occasional
 2 19 *Elephantopus spicata*
 occasional
 1 20 *Datura stramonium*
 rare
 5 21 *Acalypha*
 common locally
 5 22 *Alternanthera halimifolia* (Lam.)
 abundant generally
 1 23 *Solanum nigrum* L.
 common
 2 23a (scrub) *Peperomia verticillata* (Mill.) Thraque
 common locally
 Jan. 24 - near large crater
 about 1 km n.w. of Pabla Mt.
 (Los Negritos).
 in mossy forest
 2 24 *Tournefortia rufo-sericea* Hook. f. (det. D.M. Porter)
 occasional
 2 25 *Peperomia galapagensis* Hook. f. (det. H. Andersen 1978)
 abundant, epiphytic
 26 (scrub)
 common to co
 1 26 *Plantago* ^(?) *Plumbago major* L. (det. H. Andersen 1978)
 occasional in open place
 2 27 *Asplenium auritum* var. *auriculatum*
 epiphytic

plants bright red
 in mass.

erect, from creeping rootstock,
 flowers yellow.

pedicels fleshy, sticky,
 caducous.

flowers pale lavender.

flow pale purplish white.

prostrate, reddish.

Stand 1.
 1975. D.M. Porter, 1975.
 plant diffuse, reddish.

extensively branching
 herb, flowers white.

det. Porter
 flowers purple.

275 m.

shrub 3 m. tall;
 flowers white.

erect, fleshy.

(Hook. f.) Morton + Lellinger det. Porter

- 44828 *Phoradendron hemslovii* (Hook. f.)^{Rob.}
 1 parasitic on *Scaevola*
 1 29 *Fleurya asstrans* Gand.
 common
 3 30 *Croton scouleri* var. *grandifolius* Muell.-Arg. det.
 occasional
 5 31 *Croton scouleri* var. *grandifolius* Muell.-Arg. det. Porter
 occasional
 1 32 *Psychotria rufipes* Hook. f.
 common
 2 33 *Bidens*
 occasional in opening
 3 34 *Parmelia*
 on rotting fallen branch
 2 35 *Asplenium praemorsum* Sw. det. Porter
 on edge of crater
 2 36 *Polypodium dispersum* A.M. Evans det. Porter 1974
 abundant terrestrial
 in crevices ~~in~~ at edge
 of crater.
 2 37 *Asplenium auritum* var. *auriculatum* (Hook. f.) Morton & Lellinger det. Porter
 epiphytic.
 5 38 *Polypodium tridens* Kunze det. Porter 1974
 epiphytic

Jan. 27 - Bella Vista
 in Horneman Garden

- 1 39 *Datura*
 planted and very persistent
 3 40 *Polypodium insularum* (Morton) de la Sota
 (with Horneman) epiphytic in avocado tree
 1 41 *Nerine*?
 planted

little.

stinging herb

Porter 1974 small tree

1974 small tree

shrub 1 m. tall;
 — fruit red, fleshy
 flowers yellow.

Porter

Porter 1974

(Hook. f.) Morton & Lellinger det. Porter

200 m.

tree 5-6 m. tall, flowers
 pendent, salmon pink.

det. Porter 1974

scandent, flowers white.
 6 stamens

44842 (grass) *Eleusine indica* (L.) Gaertn.
in trampled path
1 43 *Sida rhombifolia* L.
abundant

1 44 *Verbena littoralis* HBK.
common weed

45

Jan. 27 Bella Vista

around cleared ground

2 45 *Sicyocaulis pentagonus* Wiggins det. v.d. Werff.

~~in~~ climbing in fence row

1 46 *Senna pistaciifolia* var. *picta* (L. Don) Irving
~~Cassia~~ & Barneby det. Barneby 84
in fence row

2 47 (solan)
occasional by paths

1 48 *Casipourea conjugatum* Berg.
~~*Eleusine indica* (L.) Gaertn.~~
occasional by paths

2 49 (lichen)
on fallen balsa trunks

2 50 (lichen)
on fallen balsa trunks

3 51 *Amaranthus quitensis* HBK det. D. M. Porter, 1975
rare in roadside canopy

3 52 *Stictocardia tiliaefolia* (Desr.) Hall. f. det. v.d. Werff.
common in thickets

2 53 *Bidens*
occasional on roadside

5 54 *Trema micrantha* (L.) Bl. (det. H. Andersen 1978)

~~common~~ common locally along road.

2 55 *Bambusa vulgaris* Schrad. ex Wendl. det. Tom Soderstrom, 1975
rare, planted

spreading prostrate culms

tall herb, about 1 m, flowers
shallow range with maroon
center.

flowers purple.

200 m.

elongate herbaceous vine;
flowers white.

shrub 2 m. tall.

buds yellow.

flowers deep purple
with pair of small
yellow spots on palate.

herb 1.5 m. tall, stems red.

erect herb 1 m. tall,
flowers yellow.

tree 8-10 m. tall.

large clumps, culms
dark green.

Jan. 27 "New Road" ~~to~~
near Bella Vista
along cleared roadway

- 44856 *Eclipta alba*
common in weedy vegetation
- 1 57 *Desmodium canum* (Gineb) Schinz +
occasional The Jung
- 2 58 *Salvia occidentalis* Sw. (det. Andersen 1978)
occasional
- 2 59 *Desmodium limense* Hook.
common
- 2 60 *Desmodium canum* (Gineb) Schinz
occasional + The Jung
- 1 61 *Coryza canadensis*
rare
- 2 62 *Priva? lappulaceae f. albiflorum* ~~det. M. J. L.~~
local
- 2 63 *Momordica charantia* L.
abundant
- 4 64 *Justicia galapagana* Lindl.
common
- 2 65 *Rhynchosia minima* (L.) D.C.
common
- 1 66 *Chiococca alba* (L.) Hitchc.
occasional in thicket
- 1 67 *Stictocardia tiliaefolia* (Desr.) Hall. f. det.
common

Jan. 27 "New Road,"
somewhat below Bella Vista
in roadside thickets

- 5 68 *Acalypha*
occasional

200 m.

erect; rays white.

erect, leaves glaucous
beneath.
flowers bluish white.

stems elongate,
sparsely branched,
flowers cream white.
erect.

~~det. M. J. L.~~ flowers white.

extensive vine;
flowers yellow.
flowers magenta-pink.

herbaceous vine,
flowers yellow.
scandent shrub,
fruit white, fleshy.

U. d. W. det. extensive vine,
corolla rose-purple.

150-175 m.

shrub 1.5 m. tall

44869 *Capsicum frutescens* L.
occasional

4 70 *Clerodendrum molle* HBK. ^{var. *glaucescens* det. M. J. B. & M. J. B.}
occasional

2 71 *Galactia vedawiana* Benth.
occasional

4 72 *Croton scouleri* var. *grandifolius* Muell.-Arg.
det. Porter 1974

2 73 *Malvastrum coromandelianum*
common

4 74 *Sida hederifolia* Cav. (det. O. M. Porter)
locally abundant

1 75 *Chiococca alba* (L.) Hitchc.
occasional

1 76 *Eleusine indica* Gaertn.
occasional in road

1 77 *Croton scouleri* var. *grandifolius* Muell.-Arg.
det. Porter 1974
common

1 78 *Senna sophora* (L.) Roxb. det. Barneby 84
common

1 79 *Heliotropium indicum* L.
occasional

2 80 *Clerodendrum molle* HBK.
occasional var. *glaucescens* det. M. J. B. & M. J. B.

2 81 *Sida spinosa* L. (det. H. Andersen 1978)
locally common

Jan. 27 - "New Road", Academy
Bay to Bella Vista, at the
last major escarpment toward
Bella Vista
On broken basalt

3 82 (fern) *Trachipteris pinnata* (Hook. f.) C. Chr. det. Porter 1974
common in crevices

shrub 1 m. tall,
flowers greenish white;
fruit scarlet.

large shrub; flowers
white, tube pinkish.
vine; flowers pink.

very common in
edges of forest.
flowers orange

prostrate; flowers orange.

shrub 1.5 m. tall,
flowers yellow.

shrub 2 m. tall.

low shrub; flowers yellow.

flowers white.

→ *H. angiospermum* Murr. (det. P. M. Porter)

shrub 2 m. tall,
flowers white.
erect.

100 m

curls up in dry weather, expands
in wet.

44883 *Polyphodium tridens* Kunze det. Porter 1974
3 common in rock crevices

2 84 *Anredera ramosa* (Miq.) Eliasson det. H. v. d. Werff
common in rock crevices

1 85 *Peperomia*
common ~~in~~ on rocks

1 86 *Usnea*
hanging from branches
of *Psidium*.

1 87 *Psidium galapageium* var. *howellii* Porter
common

5 88 *Phyllanthus carolinensis* Walt. subsp.
common in crevices and
along road.

Jan. 27 - "New Road"
above Academy Bay.
dry cleared roadway
on rocks and heavy ~~soil~~ soil

3 89 *Portulaca oleracea* L.
common.

3 90 *Portulaca oleracea* L.
common

2 91 *Vigna Rhynchosia minima* (L.) D.C.
rare

1 92 *Physalis*
rare

5 93 *Heliotropium andersonii* Robins. (Det. P. M. Porter)
common on bare hard red soil

Twining vine, flowers
yellow, turning reddish.
— very fleshy, stems and
spikes reddish.

spreading tree 5 m. tall.

branches more or less
in one plane.

det. S.M. Porter
Dec. 1969

carolinensis
det. D.M. Porter
1974

30-50 m.

prostrate, fleshy, no
flowers open in late afternoon,
with 44890 but not
intergrading with it.
— ascending, leaves large,
no flowers open in late
afternoon; with 44889
— but not intergrading with it.
prostrate, twining,
flowers yellow.
— flowers yellow;
fruiting calyx prominently
angled, strongly depressed at base.
— erect; flowers yellow.

44894 *Alternanthera halimifolia* (Lam.)
 2 on hard bare red soil

2 95 *Euphorbia viminea*
 common on hard bare
 red soil

10 96 *Froelichia juncea* Robins & Grev. subsp. *alata*
 one bush seen on hard
 bare red soil

Ret.
 D. M.
 Standl. Poster,
 1975.

Howell
 (det. H.
 Andersen 1978)

stems ascending.

~~to~~ flat-topped shrub,
 branching in one plane,
 stems brown, leaves
 fleshy, brownish green.
 much-branched
 shrub about 1 m. tall,
 fruiting stems arching
 and pendent at tips.
 (seed sample)

Jan. 27 - "New Road" from Bella Vista to Academy Bay

This is a broad swath bulldozed through the forest from Bella Vista in almost a straight line from the corner of the clearing to the head of the Bay. There are one or two turns or jogs.

The road crosses about 4 scarps - one, at least, is a major fault. The others may be faults or else toes of lava flows.

The upper part is very disturbed close to the village, with most of forest cleared.

Then there is a rather disturbed, or at least open, evergreen forest - *Psidium*, *Scaevola*, etc.

This acquires a mixed character and is rather uniform for some distance.

Below the village some distance the edges are lined with saplings of what must be a species of *Scaevola*, though in habit it resembles the enormous *Polynonia* in Colombia - stems not as thick. It seems all sterile.

Ochroneura
grove

At first this forest has a dense herbaceous undergrowth. After some distance this thins out somewhat. *Psidium* still persists below its uppermost escarpment.

A dense growth of weeds occupies the road swath, but much of this is trampled so the weeds are not very rank. *Sida rhombifolia*, of a particularly large-leaved and robust form, is most abundant.

The herb layer becomes very thin about half-way down, but the canopy, for the most part, remains closed most of the way to Academy Bay. Its composition gradually changes and *Bursera* becomes more prominent, while things like *Psidium* dropout. *Pisonia* is perhaps the most dominant tree for the entire middle part of the road. The sharp zonation of the other trails is not very obvious here. The forest stays more or less closed almost to Academy Bay.

but is
xerophytic
near there

Jan 23 - helicopter flight
across Indefatigable I.
Academy Bay - ~~Balta Vista~~
- Table Mt. - Seymour I. 1:50 p.m.
Completed rolls of film & took
from air.

Aspect of higher parts
of island green, as much
from thick undergrowth
as from trees. Psidium and
Zanthoxylum trees are
brown, Scaevola bright light
green.

As soon as low plain on
north side is reached
the aspect becomes light
gray. The forest varies
from closed to open. Near
the coast are patches
with almost no vegetation
lava with red soil in
depressions.

Balta I. is almost
entirely modified by air
base activity. General
aspect is desert - red soil
& black or gray lava with
scattered trees & bushes.

A younger lava is more
vegetated and oxidized than
an older surrounding glassy, black.

From deck of USS Pine Island,
Baltra I. is essentially
flat, with 3 or 4 terrace
levels, topmost is completely
disturbed by old air-base.

Vegetation generally very
sparse, red ground showing
through. Some green back
of beaches - mostly Maytenus.
Scattered trees with white
trunks and branches - prob.
Bursera. This is densest
on the low area between two
higher terraces.

North Seymour is also
essentially flat, sloping
gradually from west up to
cliff on east. Vegetation of
Bursera seems much denser
than on most of Baltra.

Daphne Minor is surrounded
by cliffs, even undercut on
one side. Flat top has thin
forest. Dawson says this is
only on rim of crater and
is only Bursera.

Daphne Major is a
fine truncated cone,
scarcely cliffed at
all. Williams says
both seem very young.
He also says that on James

1964 Galapagos

Jan. 29 - Left ship by
Helicopter 7:00 a.m. Arr. 7:10Island is mostly
wooded with a Croton
scrub up to 4 m. tall

Small meadow-like
areas around periphery
and also have an
open dwarf scrub or
broad-leaf herb meadow
of *Alternanthera* sp.
which strongly resembles
Chenopodium *boissacense*
about 3 dm. tall, rounded
compact bushes. A few
herbs between these
clumps - *Cyperus*, grass,
Chenopod. ~~*boissacense*~~

Cuscuta on *Alternanthera*Furcular openings in
interior (photos - 69 v)

Also thin places in scrub
with many dead Croton
and some still alive
but much less luxuriant
than the surrounding
ones (photos - 69 w)

On slopes - dip slopes of
tuff beds - open Croton
scrub with thin grass
and amenth herb, no *Alternanthera*
(photos 69 w)

Culpepper (Darwin) I.

Mocking-bird nesting
finches 2

Red footed boobies 11

Masked boobies 11
(pink bill)

Frigate birds 11

Sooty terns 11

Large gull-like bird "
with gray back, black
head, white underparts
and a bright red ring
around eye, beak somewhat
hooked. " in thin place
in interior.

Ground-dwelling, quail-like
pigeon: ^{dark red bill} brown with white marks
on outside of wings, white wing
patch when flying, bright blue ^{leg} feet, black bill ^{sl. curved down at tip} ^{underneath green areas on yellow} ^{black} ^{mark}

The sooty terns nest
here even under the
densest scrub, although
more numerous in openings.
Even in cactus clumps.

There are one or more nests
of red-footed boobies in
almost every Croton bush.
Finch nests in *Alternanthera*
Masked booby nests on
ground in openings and
in scrub.

A few young frigate birds.
Pigeon walks around on
ledges of canyon.

On these upper slopes of the hill an open scrub with thin grass is general. In a shallow ravine as low clumps of *Opuntia* with soft yellow spine, a little *Alternanthera* more grass, but grass cover thin and discontinuous.

Hilltop is covered by thin cotton scrub ^{1-1.5 m.} with an understory of *Opuntia* 1-1.5 m. tall.

In an opening on far slope a colony of *Portulaca lutea*, with a little grass and *Alternanthera*.

A deep canyon cut in harder tuff layer, iron smooth, light gray sparse cotton scrub on walls, a little grass and *Alternanthera*.
Photos taken, Kod.

Down in the canyon the *Alternanthera* is much more luxuriant than seen elsewhere, up to more than 1 m. high, in masses.

Beautiful view at mouth of canyon, lower-

like rock (photos taken, Kod).
On top red spots, thought to be plants with masses of red flowers - turned out to be male frigate birds with pouches expanded. ~~So~~ *Opuntia* around tops of cliffs. A little *Portulaca* on top ledges. But *Alternanthera* is most of cliff vegetation. A moss on peaty soil on ledge.

In canyon bottom several pools filled with rotting vegetable debris.

Forked tailed gulls making a noise, but wailing, squealing & whistling. Hundreds or thousands of red footed boobies. Several frigate birds. Many fowls. A few pigeons.

Many frigate birds soaring.

Canyon is cut deep into tuff beds but ends in a cliff. Beautiful rocks below in water (photo Kod).

Very hot in canyon, boobies panting.

Many grown young ^{red footed} boobies not yet able to fly. Some

Just to right (looking upstream) of the head of the canyon, is a large (2-3 acres) open slope, one half of which is covered by a bedraggled open scrub 0.5-1 m tall of beaten up croton bushes, with much *Portulaca* between them (photos), the other half a low semi-open growth of *Alternanthera*.

photos Many masked boobies nesting here, with downy young. In scrub many green young of red footed booby (photos)

At about 3:45 p.m. a shower went by, and just a bit of the edge of it ~~was~~ hit the island. Great clouds of sooty terns were in the air while it rained, making a tremendous clamor.

The dwarf scrub of *Alternanthera* varies from open to closed. The individual clumps are 2-4 dm tall and 3-6 dm across, touching or separated by up to 1 m. Each bush has an

intricately branched woody basal part much smaller than the bush, from which herbaceous shoots are produced in abundance. The association is principally the one species but the grass, the *Cyperus*, the *Amaranthus*?

Jan. 30 - around camp. Saw short-eared owl sitting between the bushes. Very tame, was watching a dove which circled about 3 feet from the owl, seeming not to be disturbed but keeping just that distance.

Mocking birds - brown with conspicuous gray collar. Two of them played together, one pursuing the other with mild pecks. One sitting on top of tent pole and singing occasionally. One found a large centipede and harried it to death, pecking at its head, jumping back when the centipede struck, eating a leg when it detached one, finally dragged the centipede off.

Jan. 29 - north side above
~~bluffs~~ cliffs (camp)
 in Alternanthera meadow

44897 Alternanthera helleri
 dominant.

2 98 Cuscuta gymnocarpa Engelm.
 parasitic on Alternanthera

5 99 (grass) Eragrostis cilianensis (All.) Lutati det. Reeder
 locally common ^{Eragrostis major Host.} (det. H. Andersen 1978)

44900 (amar.)
 occasional

~~Croton~~
~~Chorizanthe~~

same - in Croton scrub

5 {01 Croton
 5 {02 Croton scouleri var. darwinii Webstr. ^{det. D.M. Porter 1974}
 dominant

5 03 (grass) Eragrostis cilianensis (All.) Lutati det. Reeder
 in very small openings
 and thin places in scrub

5 DET. D.M. Porter 04 (amar.) Amaranthus scleranthoides (Anderss.) Anderss.
 common in small openings

5 05 (grass) Eragrostis cilianensis (All.) Lutati det. Reeder
 in opening

same - in Alternanthera scrub

5 06 (amar.) scleranthoides (Anderss.) Anderss. ^{DET. Porter 1974}
 occasional

5 07 Cyperus anderssonii Bäckeler det. Koyama
 occasional.

140m

dwarf shrub or
 suffrutescent herb,
 2-3 dm. tall, grayish
 especially toward tips.
 yellow-orange, thread-like,
 sterile.

small tufts

delicate herb

Q
 ♂

shrub 2-3 m. tall
 aromatic when broken.

150m

wispy tufts.

small wispy tufts.

140m

stems red.

1974

1964 Galapagos Is.

Jan. 29 - near highest summit on island

44908 *Croton scouleri* var. *darwinii* Webstr. det. D.M. Porter 1974
dominant in tall scrub

09 *Portulaca ~~abundans~~*
abundant on open slope

10 *Tribulus cistoides* L.
rare on open slope
dominated by *Alternanthera*
dwarf scrub.

11 *Portulaca*
common in openings
on slopes

12 *Portulaca howellii* (Legr.) Eliass. (det. H. Andersen 1978)
common in openings

13 (grass) *Eragrostis major* Host. (det. H. Andersen 1978)
Eragrostis alianensis (All.) Lutati det. Reeder
locally common on
open slope

same - ~~same~~ canyon
at west end of island

14 *Cyperus anderssonii* Bockeler det. Koyama 1974
rare on upper ledges

15 (moss)
rare on cliffs at mouth, on peat

Culpepper I.

165 m

sterile young plant
to show large leaves.
fleshy herbs, stems
ascending, gray at
base, red above,
flowers yellow, about
1.5 cm across, open 10:30
on, petals emarginate,
stamens about 20, style
branches 4-6, mostly 5.
prostrate, flowers
yellow, about 1.5 cm across.

160 m

ascending,
fleshy, stems brownish-gray
at base, brownish green
above, flowers yellow.
fleshy, stems prostrate
at base, tips ascending,
base gray, distal parts
brownish green, buds
yellow.
tufts

150 m

Tufts.

140 m

soil.

bright green.

~~Jan 25 - North side~~
~~Culpepper I.~~

44

44916

Alternanthera helleri
 common on ledges

Erythrina velutina Willd.

Jan 29 north side

2 44917

Erythrina velutina Willd.

with
 E. Y. Dawson

rare, only 2 trees seen

Jan 30 - northwest side (camp)
 in *Alternanthera* dwarf
 scrub.

5

18

Cenchrus platyacanthus Anderss. det. Porter
 common on slight
 rocky escarpment.

det.
 Porter
 1975

19

Amaranthus scleranthoides (Anderss) Anderss
 common in spaces
 between *alternanthera*

1

20

grass *Eragrostis cilianensis* (All.) Lutati det. Reeder
 common in spaces between
Alternanthera

1

21

Alternanthera helleri
 abundant

dwarf shrub 4 m. tall.
 herbaceous branches
 from woody base.

135 m

sterile tree.

140 m

seedlings only. old
 fruits abundant on
 ground. Old coarse
 stems dried and decayed
 seen here and there.
 stems reddish.

seedlings.

Jan. 30 - camp - etc.

Finches probed heads
in cactus flowers.

Said to be several species
but hard to distinguish.
Geospiza difficilis in one
hive in *Alternanthera*.

Immature red-footed
boobies seem to be sitting
on nests with eggs.

Along the coast to the
west of camp the croton
scrub is rather open,
varying from closed to
at least as open as
70%, coverage occasional
areas completely open.

There is a fairly complete
ground layer of *Alternanthera*,
varying from closed to open
(photos). In some openings
in the scrub this layer
is sparse or absent. Terns
are abundant generally,
but those in openings are
mostly just resting while
those in at least partial
shade have eggs or chicks.
Chicks vary from newly
hatched to having wings
feathered out. The red-footed
boobies are abundant
in the trees, with eggs or

young. Occasional
frigate bird resting on
ground or on sticks,
mostly immature.

On the outer edge, above
the cliffs there is a space
where the vegetation is
sparse or lacking for
a few meters, for
considerable distances.
Few masked boobies are
nesting in abundance
with eggs, newly hatched
young, some downy young.

The scrub varies in
height but is mostly
2-4 m. and the trunks seldom
reach more than 6 cm.
Many dead bushes still
standing, but easily
tipped over.

Exposure of very coarse
porphyritic basalt on
n.w. corner. Cox drilling
it for paleomagnetism measurements.

Vegetation on cliffs
mostly *Alternanthera*,
some croton. ~~There~~ some
male frigate birds on
cliffs with distended
pouches.

Many tern eggs with holes
hatched in them.

Headland covered by Alternanthera, with scattered Portulaca and patches of Amaranthus, hundreds of masked boobies nesting. One Forked Tailed gull, nesting, had to be pushed off to see egg.

Soil pale blue-green, ~~gray~~ ^{gray} with gray and very dark brown. (photos)
Under an Opuntia bush, (collected) (photos)

South of this is an area of bare ground with scattered crot. a few Portulaca and Alternanthera, and hundreds of masked boobies. (photos)

This gradually changes to thicker scrub and the boobies are replaced by terns, great numbers of them, with eggs & chicks. Then a small, completely bare place, where terns are just sitting.

Took soil sample 3 in this - almost black fine soil, 2-4 inches thick on rock.

Nearby in fairly dense

Croton scrub 2-3 m. tall sample #4, also just a superficial layer 2-4 inches deep, of black soil, with many roots.

Back by the camp took soil sample #6-7-8 in ~~scrub~~ Alternanthera scrub, top layer, 1" is nearly black, next layer, 3" deep, is reddish brown, this is on rubble material, rather rotten, #3 is also reddish to yellowish brown.

Sample #9 is from within dense Croton scrub back of camp. Here only a layer 2-4" deep on rock, black on top gradually becoming browner downward.

Sample #5 is lava from n.w. point

Sample #2 is rotten tuff from top of cliff on w. side of deep canyon at its mouth.

Jan. 30 - ^{south?} ~~northwest~~ headland
of island.

Det. Porter 1975

44922

on open top of bluff,
~~in~~ Alternanthera scrub.
Amaranthus scleranthoides (Anderss.) Anderss.
locally dominant

2 23

Portulaca
common

2 24

Opuntia cf. helleri
isolated clump

Jan. 30 - east of camp

in opening in Crotan scrub

1 25

(grass) Eragrostis cilianensis (All.) Lurati
common

det. D.M. Porter
1974

1 26

Crotan scouleri var. darwinii Webstr.
abundant

det. D.M. Porter
1974

140 m

↓

stems from clear green to
clear red in same colony.
~~stems~~ plant fleshy,
stems reddish, gray
at base, ascending,
flowers 1.5 cm. across,
petals emarginate,
stamens about 20.
clump about 1 m. high,
spines stiffer on basal
joints, yellow, soft ~~stems~~
on upper joints, flowers
yellow, fruits caducous.

seedlings

Jan. 30 - coast east
of camp

area of Croton
scrub with or
without Opuntia
& with or without
scattered Alternanthera.
One Erythrina tree
about 4-5 m. tall

Near it an area
of very open Croton
with Portulaca
covering much of
the ground between
trees. Starting to close at
3:30 p.m. Short grass

Mosching birds nest
in Erythrina 3 beautiful
green-blue eggs, spotted
with dark maroon on
large end. One bird
sitting. Other brought
a cricket. He attacked
me, pecking my head
when I disturbed the
sitting one. Both
made quite a fuss.

Immature gull
speckled gray, white
above, no red eye ring,
eye & beak entirely black.

Cenchrus

Poa?

Amaranthus:

Alternanthera

Portulaca

Cyperus

Erythrina

Tribulus cistoides

Croton

Cuscuta

Probably a ^{dynamic} ~~successional~~
relationship between
concentrations of birds
over a period of time and
destruction of Croton scrub.
Birds tend to occupy the
openings, slowing down
vegetation. Portulaca & grass
seems to do best in open
in spite of birds. Little
tendency evident for
Croton to invade
Alternanthera dwarf
scrub. But where
Croton is thin, Alternan-
thera forms an understory.

Jan 30 Left Culpepper
at 5:15 pm. for Wenman
On arched rock near
culpepper, is green vegetation
on flat top.

Wenman I. - small
flat topped island off
shore and flat part
of main island covered
by a thin open Croton scrub
the bushes 2.5-5m. tall,
fastigiously branched,
leaves 4-8 ~~cm~~ ^{inches} long.

Stems seldom exceeding
3 cm. dbh.

This is an extremely
rough bouldery ground,
but under surface layer
of boulders is a layer
of black soil.

In much of the
scrub there is a prominent
ground layer of Alternanthera
but in places this is
lacking. Opuntia is in
places abundant, up to 1m.
so tall, in places scattered,
in places lacking.

Spacing of the Croton
is generally from 0.5 to
1.5 m. but crowns are so
sparse and narrow and
irregular that coverage

is very incomplete.

Large openings or very
sparse places in the scrub
are dominated by Opuntia
but have Ipomoea, Portulaca
Cenchrus, possibly
Boerhavia scandens (too
dried up to be at all sure)
Alternanthera, and
in lower, wetter ones,
Cyperus & ~~if~~ ^{or} Mollejo.

Center of area, in a
rather sparse place,
a male frigate bird, with
red powder, sitting on
egg, early afternoon.

In central part of
area about 2/3 of Croton
are dead, mostly fallen.

Here there are no boulders,
only sharp pebbles & cobble
size debris lying on soil
surface.

Scattered clumps of
Alternanthera and patches
of Cyperus.

Here the red footed boobie
& frigate birds are nesting
in fallen trees rather
than standing ones. Some
are fallen while still alive,
these and perhaps dead ones.

Jan. 31 - ~~nat~~ ^{nat} corner

in thin *Croton* scrub

44927 *Sporobolus linearifolia* Hook. f. (det. H. Andersen 1978)
occasional in opening

5 28 *Croton scouleri* var. *darwinii* Webstr. det. D.M. Porter 1974
dominant

5 29 *Alternanthera halleri*
very common generally

1 30 rare in open area at top of cliff
1 31 *Croton scouleri* var. *darwinii* Webstr. det. D.M. Porter 1974
dominant

5 32 *Croton scouleri* var. *darwinii* Webstr. det. D.M. Porter 1974
dominant

2 33 *Mollugo gracillima* Anders.
in earth filled interstices
between lava boulders in
opening

5 34 *Cyperus aristatus* Rottboell det. Koyama 1974
abundant in earth-filled
interstices between lava
boulders, in opening

5 35 *Cyperus anderssonii* Bockeler det. Koyama 1974
common in opening

5 36 *Portulaca*
abundant in opening
also seen at tops of cliffs

100 m



extensive vine; flowers
pale lavender with
deep purple center.
slender shrub 3 m. tall

bush 0.7 m. tall, woody
up to about 0.4 - 0.5 m.
sterile

slender shrub 3 m. tall

shrub 3 m. tall, sap
reddish, somewhat watery.
sterile

erect tuft

fleshy plants,
stem ascending, gray
at base, reddish, flowers
2 cm. across, yellow, petals
emarginate, stamens 22-24,
style branches 3-5, mostly 4.
fls open mid-morning to at
least midafternoon.

all pointing more or less east. Older dead ones, in other directions.

On east side of flat peninsula a grove of *Erythrina* lining top of cliff. Sterile at this season. Varying from tree to tree in leafiness.

A red footed booby ~~was~~ sitting on egg in one of these trees. A pair of *Geospiza difficilis* were lighting on its tail and pecking up under the upper tail feathers and, pushing aside the wing tips. Every little while the bird would flick its tail. The finch would jump aside, ~~but~~ wipe its beak, then return. This kept up for 15 minutes or so. I thought it was insects they were after, and since they pecked about on the feathers, it may well have been. However, close examination showed that the area at bases of main tail feathers was bleeding and the birds were mostly pecking at the blood.

Birds seen

Red footed booby	nesting
Mashed booby	"
Frigate bird	"
Mocking bird	
Doves	
<i>Geospiza difficilis</i>	
<i>Geospiza</i> sp.	
Forked tailed gull	

In the *Erythrina* grove which is a couple of hundred yards long and 50 or more wide, the ground is covered by a continuous layer of pebble to cobble size fragments under which is a 15 cm⁺ layer of black fine soil, then rubble. ~~very dark brown~~

~~The~~ Locally there are enormous angular boulders, but very few. On this surface are seedlings and young plants of a number of species not or scarcely seen elsewhere, some in numbers, others rare,

is red-billed
note
deciduous

Around cliffs on a
side - ~~the~~ white-tailed
Tropics bird - beak red!
Several forked-tailed gulls.
Hundreds of masked boobies
nesting on edge of cliffs
at least half way up
mountain.
Geospiza difficilis flitting
around these bare rocks.

On this ridge, and
more especially at the
foot of the talus below it
at the very edge of the
cliff, *Scaevola* is scattered,
only a few bushes - gnarled
sprawling stems with
clumps of compact branches
at ends - the whole not
much over 1 m. tall.

Associated with stunted
Croton, some *Portulaca* and
abundant *Alternanthera*.

On other side a colony
of *Heliotropium* just
in from cliffs in rather
dense Croton scrub.

Cliff tops more or less
bare, nesting place for
countless masked boobies.
Alternanthera, Croton, *Portulaca*.

Narrow both ways is
a knife-edge, with
same three plants.
Peninsula is flat
topped and covered by
Croton scrub.

Photos of Croton T
show fastigiate habit.

Steep talus on east
side at base of cliffs
of high crag - open
Croton scrub, with
some *Opuntia*, and an
open shrub layer of
Alternanthera, a few
scattered *Scaevola* bushes.

From high on main peak -
peak - depression runs
diagonally across from
Erythrina grove that
seems to have larger
Croton (Photos below)

Jan. 31 - West side
in Crotm scrub just
back from cliff

- 44937 *Heliotropium parviflorum* L. →
small colony

Jan 31 - east side

- 10 38 *Scaevola incisa* Hook. f. <sup>*Scaevola baueri*
ssp. *hopkinsii* (Robins, Elias)
(det. H. Andersen 1978)</sup>
a few bushes at foot of talus
on cliff edge.

- 6 39 *Alternanthera helleri*
dominant on talus

- 5 40 *Scaevola incisa* Hook. f.
on ridge <sup>*Scaevola baueri* subsp. *hopkinsii*
(Robins, Elias)
(det. H. Andersen 1978)</sup>

Jan. 31 - east side

in *Erythrina* grove

- 5 41 *Acalypha*
locally common

- 1 42 *Heliotropium parviflorum* L. →
rare

- 14 43 *Cardiospermum corindum* L. det. H.
very local

- 5 44 *Erythrina velutina* Willd.
dominant

- 2 45 lichen
on branches of *Erythrina*

120 m

- H. angiospermum* Murr. (Det. D.M. Porter)
small shrubs up to 0.6 m. tall.
flowers white, eye greenish.

gnarled bush ^{0.8 m. tall} with
compact clumps of foliage
at ends, involueral
bracts maroon at tips, rays
& disk white.

140 m

densely branched
bush 0.4 m. tall.

150 m

gnarled bush 1 m. tall,
densely branched at
tips. flowers white.

100 m

- ^{sterile}
H. angiospermum Murr. (Det. D.M. Porter)

M. Porter
1970

climbing in undergrowth.

thorny tree 5 m. tall,
widely spreading,
pods and ~~seeds~~ beans from
ground.

- 44946 *Fleurya aestuans* Gaud.
common
- 47 *Galactia*?
rare
- 48 *Rhyzalis* cf. *angulata*
rare
- 49 *Amaranthus*
occasional
- 50 *Ipomoea*
rare
- 51 *Ipomoea*
occasional
- 52 *Ipomoea*
rare, 1 plant seen
- 53 *Setaria*
rare

Jan. 31 - center of north plateau

- 54 *Cyperus*
common in sparse open area in Croton scrub
- 55 *Cenchrus*
common in sparse to open area in Croton scrub
- 56 *Ipomoea*
abundant in sparse to open area in croton scrub climbing over Opuntia

- all plants young
- all plants young
- seedlings only, seen.
- all plants young
- seedlings only
- seedlings only
- seedling only
- erect tufts

erect tufts

seedlings, only, seen.

wine, flowers white, with purple center

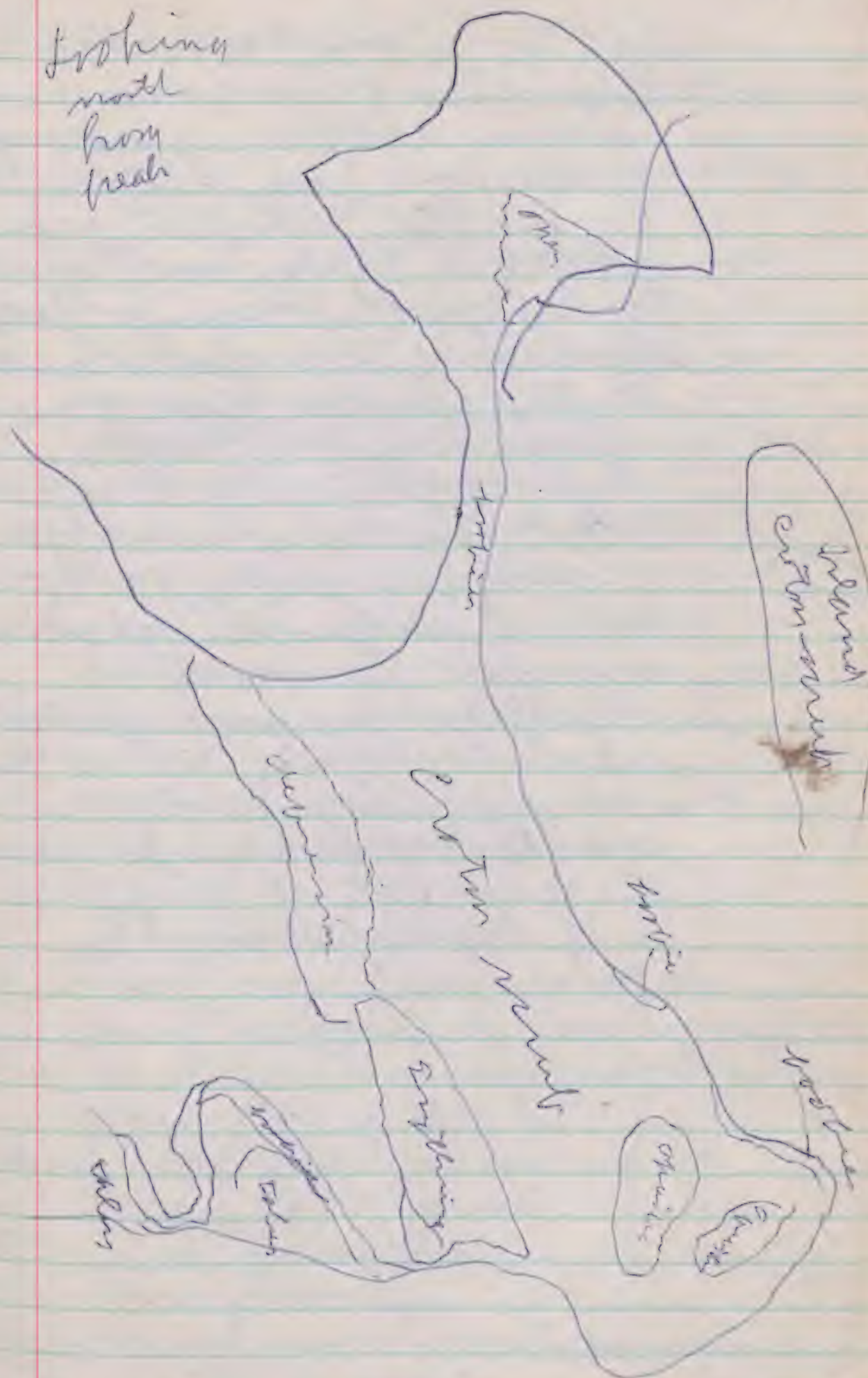
First summit - covered by a thin scrub of *Croton* with a sparse ground layer of *Alternanthera*, some *Portulaca*, a few other herbs, a few scraggly bushes of *Cordia lutea*, some *Opuntia*, a ~~few~~ very few small bushes of *Scaevola*.

The small cirque like hanging valley on the west peak appears a bit more mesophytic - but still sparse *Croton* scrub.

Difficult to reach because after a sharp knife-edge there is a 2 m vertical rock ridge with no apparent hand or foot holds.

The deep almost vertical canyon between the two on the west side has some seepage spots with perhaps a grass or sedge not collected and on the talus in its bottom a plant not recognized - perhaps a depressed *Alternanthera*. The *Scaevola*

Looking
north
from
peak



in the seepage spots has larger leaves

Feb. 1 Extreme rocky point of island. Three chabs, a small marine iguana, Frigatebirds (many), masked booby (many), forbes tailie gull (many), Geopiza difficilis. No nodules seen, but reported from here yesterday by others.

Only vegetation a few alternanthera bushes + Opuntia on cliffs.

Crabs seen only on this side of island. Also marine iguana.

Yesterday saw petrels - neat looking, curved wings, black above, white beneath, flying in and out of cliffs of long peninsula.

- 1 Phosphatized (?) tuff from surface of ground, Culpepper?
- 2 rotten tuff from near mouth of large canyon.
- 3 black soil from bare spot in Croton scrub, center of I.
- 4 black soil from ~~the spot~~ in Croton scrub, center of I. near #3.
- 5 ~~black soil from Croton scrub, near #4~~. Coarse basalt.
- 6 soil sample - black soil from ~~Croton scrub~~ ^{near} ~~I. 7-9~~.
- 7 soil sample, Culpepper?, in alternanthera scrub, surface.
- 8 same middle layer, red-brown.
- 9 same partly weathered parent material.

W. in man

- 10 black soil from under pebble layer in Erythrina grass.
- 11 crust on lava in overhang near top of peak.
- 12 purple surface on lava near top of peak.
- 13 ~~beachrock~~ ^{Leymus}.
- 13 beachrock.
- 14 beachrock and sand. Harborough I.
- 15 blue material from ground.
- 16 Pumice from 1000' alt. pumice field.

Feb. 2 - Reconnaissance
helicopter flight - Roca
Redonda, Narborough,
north part of Albemarle.
started 6:30 am.

Roca Redonda is a tiny
flat topped rock several times
as long as wide and at least
as high as wide, perhaps
higher. Top is whitish and
not rough, perhaps phosphat-
ized. Sides rough, some
layers roughly columnar
jointed. Only trace of vegeta-
tion is what seems to be green
algal staining in places
on the sides, esp. the west side
and north end. Many
hundreds of forked tailed
gulls seen, several frigate
birds and red footed boobies.
Albemarle I.

~~Narborough I.~~ - west
peak is a high plateau
with forest on top. Separated
from other part by a barren
lava intrusion with
cones like craters of Mont.
Esp. on west side there is
green veg. above the basal
flows. On cones on west
is open to sparse *Banksia*,
esp. in craters.

On sides of main cone
above basal flows, also,
sparse *Banksia*, etc.
On lava flows nothing
small ponds in
lava near s. shore.

At base of steep scarp
on alluvial fan some
bright green vegetation.
The top and sides of
this mountain would
repay exploration.

Narborough I. - north side.
Vast lava flows at foot
and on lower slopes. some
show several small trees
patches of trees, patches of
grass, bits of mangrove
fringe. white sand beaches,
many ponds and
complicated shore line
with mangroves and
some sand stranded veg.
clumps of short *Cereus*
in crevices of lava flow.
This is Punta Espinosa.
Landed at 7:25.

main square
Rhizophora and Laguncularia
around salt water ponds.

Took off at 7:35
cluster of little cones
on lava flows
Near base of mountain

bipulbas of what appears to be *Bursera*, very sparse. Some slightly older flows and bipulbas with a few short *Jamnosceus* (?)

Toward other side clusters of new cones and bipulbas of rather dense *Bursera* forest. As we go around the bipulbas become greener and greener but many are on newer lava and still not very vegetated.

There even a new lava scattered cacti. But nearer coast nothing on ~~lava~~ new black lava.

On older gray lava scattered bushes and cacti, green bipulbas. Vast lava beds with scattered bipulbas and on older part, scattered cacti.

Small clumps of cones scattered around - "lunar landscape"

The farther around we go the greener the bipulbas. On s.w. side the slope are green above the lava flows. Many bipulbas are small cones.

Whole flower, from base of mts. to sea are green. Open part, probably *Bursera* with some brush. This on s.w. side.

The flows become greener away from sea.

On side of mountain the vegetation seems to be a green scrub, with trees in lower places and ravines. Worth an extreme effort to get up to the zone. Mountain top seems flatish, covered by a low forest.

Many tiny cones and narrow flows.

Patches of grass with trees, mostly an almost closed forest with a grassy growth - some scoparioid shrubs? between trees.

Large area of forest, the upper part is mixed, much of it *Falsia*.

All of this on west side of crater.

Some water in bottom of crater but not a real lake. North ^{west} slope steep, craggy lava flows. Many vegetated bipulbas lower down, some rather

high - the lower are leafless, the higher are green. Some veg. on lava.

Top of north side also wooded plateau upper *hibubas* green lower leafless but dense forest. No veg. on lava.

Lava pool in bottom of crater, also a large cinder cone with a green lake in its crater. Nothing on lava pool. Some water in places on surface of lava pool, esp. toward west side.

On ^{north} east side the uppermost *hibubas* are lush and green, closed forest, become more open and less green downward to almost barren near lava plateau at base. These lower *hibubas* are brown against black new flows.

No mangroves along coast here at all, except at and near Punta Espinosa which is an extremely complicated bit of coastline.

Crossed channel to Albemarle. Saw against us.

Very complicated beach enclosing a lagoon on west coast at about center. Beaches here are

gray. Some very small bits of green vegetation - mangrove.

Lava flows on this side are rather - or completely - barren. Some scattered cacti or older ones and *hibubas*. - Large cacti are scattered on upper surfaces.

Crossed second saddle. Here are many but widely scattered cacti and a few other trees.

This slope of second mountain to left of us, bright green. Upper *hibubas* and slopes to right in interior have considerable vegetation - largely deciduous, just coming into leaf. This especially in *hibubas*, which are very numerous.

Slopes of second mountain are less green toward east coast, but a wide plain here is vegetated except at extreme coastal strip. *Hibubas* along coast are sparse & openly vegetated. Flowers have scattered cacti and small trees, but are generally barren.

Penalty in coast has nothing or flows, very thin vegetation in bays. Extreme coastal bays have nothing. One bit of mangrove around a tiny bay and to it. and several mangrove trees in ponds back of shore just to left of cove.

Feb. 2 - Duncan? seen from ship

gentle slopes, thinly vegetated, low sea cliffs on n.w. side, higher on s.w.

Nothing that looks from a distance like forest. Yet no very unweathered lava. General gray-brown to very slightly greenish appearance. Perhaps thin grass & low scrub [is scrub]

A large crater still visible.

Feb. 3 - left Paltia for Narborough at 11:50 by helicopter flew over Daphne Major. Scattered low Opuntia in crater, some on outer slopes. also ~~low~~ bare bushes. Otherwise thin grass, etc. Bottom of crater is a flat with no vegetation, apparently a pale gray or buff ash, but probably caked by water. (photos).

A number of small islands or rocks east of ~~the coast~~ for James? - photo with helicopter. These islets are rather barren-looking from a distance.

A small slightly elongate rock and others, on a group of 3, have almost no vegetation - very thin dry grass (or lichens?).

Tower I. (?) - barren-looking but apparently has a deciduous scrub vegetation and Opuntia. Prominent yellow patches seem to be either a yellow tuft or another, prostrate, Opuntia.

Feb. 1 - summit peaks
and plateaus

44957

Scaevola

occasional

5

58

Cardiospermum corindum L. det. D.

on plateau

1

59

Ipomoea

common on plateau

2

60

Cordia lutea Lam.

rare, a few scrappy
bushes on rocky summit

2

61

Heliotropium parviflorum L.

occasional on rocky summit

1

62

(grass) Eragrostis cilianensis (All.) Lurati

det. D.M. Porter
1974

rare in crevices on rocky summit

1

63

Cyperus anderssonii Bockeler det. Koyama 1974

common on rocky summit

(abundant in places on plateau)

5

64

Portulaca

common

5

65

Cuscuta gymnocarpa Engelm.

very rare, parasitic on
Alternanthera (and slightly
on Mollugo)

2

66

Ranunculus

very common on crevices

same - on rock ledges and
crevices just below summit

5

67

Euphorbia nummularia (Hook. f.) Burch

occasional at base of cliffs

230 m

shrub, flowers white.

M. Porter
1970

vine, flowers white.

seedling only collected

shrub, corolla yellow.

flowers white
H. angiospermum Murr. (Pet. D.M. Porter)fleshy, lower stems
gray, upper red; flowers
yellow 2 cm across, petals
emarginate, stamens 25-27
style branches 4-5.
pale range threads;
flowers white.

210 m

det. v.d. Werff
little, glaucous, branches
more or less in one plane.

Det. D.M. Porter
1975

- 44968 *Amaranthus scleranthoides* (Anderss.) Anderss
common on ledges and talus
- 1 69 *Alternanthera helleri*
abundant on ledges and talus
- 1 70 *Croton scouleri* var. *darwinii* Webstr. det. D.M. Porter 1974
common
- 5 71 *Heliotropium angiospermum* Muir. (Det. P. M. Porter)
rare in crevices
- 6 72 *Mollugo gracillima* Anders.
common on ledges and in crevice.
- 5 73 *Fleurya aestuans* Gand.
very common in on ledges and talus.
- 3 74 (grass) *Eragrostis cilianensis* (All.) Lutati det.
occasional on ledges and talus
- 75 *Croton scouleri* var. *darwinii* Webstr. det. D.M. Porter 1974
abundant on steep ridge and talus

Feb. 1 - on north point
in terrace

- 76 ~~*Amaranthus*~~ abundant in
openings in *Croton* scrub

Feb. 2 - Punta Espinosa
Marborough I.

around lava pools

- 77 *Rhizophora mangle* L.
local, growing in salt water on lava
- 78 *Laguncularia racemosa* (L.) Gaertn.
local, growing in edge of salt water on lava.

200 m

stems red.

small shrub,
grayish green.

210 m

shrub 1.5 m. tall.

(extreme leaf size)

M. Porter)

dwarf, shrub, flowers white.

petals 4-5 patent, white;
plant diffuse.

200 m

stinging

Reeder

shrub 2 m. tall.

100 m

decumbent with
ascending branches,
spine on upper joint,
very weak, yellow;
fruits green, proliferous.

shrub 3 m. tall.

shrub 2 m. tall.

Central Albemarle -

vast flow slopes reaching far up the side of the volcano before the break in slope up to the main cone.

Bits of mangrove locally along coast. Vast areas of old flow with open to closed *Bursera* forest, beginning to turn pale green up slope. Sparse on less weathered lava, and only scattered trees in the darker flows. No really new lava here.

Upper part of this forest quite green, very mixed and closed but rather thin. Much long *Usnea* on trees. Canopy surface very irregular. Many shades of light green.

Then a very rough lava field - aa. with scattered trees, smaller *bipulbas* well forest, some places almost nothing.

Other slope, beyond this aa, similar to upper part of east side, but gets more and more bare downward.

But here change is spotty some large green trees and many small bare ones. No pure *Bursera* ever down near shore.

Narborough I. - Considerable mangrove around large ponds and on beaches for a short distance along shore where we crossed. Then bay lava of several ages with no vegetation for a long distance. Then a rift with scattered elongate breached cones - new. Then older lava with scattered *Cereus* and small green *bipulbas*. 2 more rifts. More new lava but with green *bipulbas* of several ages. Alternating flows of different ages: some green, most brown with scattered vegetation, some with almost none. More rifts. Many *bipulbas*. Then a strip of green, very wide.

Feb. 3 - s.w. slope of Narborough? 1000'

Sparsely to well vegetated
lava, with *Bursera*
and *Zanthoxylum* trees
scattered, more densely
in lower spots.

Thick shrub layer of
Psychotria, *Cordia*, *Solanum*, *Epiphaea*,
etc., many ferns
Pilea, *Polka*, *Lycopodium*,
Acalypha, *Setaria*, etc.
on ground.

Trees more abundant
near base of small cone,
here *Psychotria* and *Solanum*
are common under trees,
not very common in
open lava. Several
vines in trees & bushes.

Carpenter bee seen visiting
Psychotria and *Rhynchosia*.

Pumice field - (photoblasted)
grassland dominated by
Bruteloua but with *Paspalum*
abundant also.

Plant list

- | | |
|----|------------------------------------|
| a | <i>Bruteloua</i> |
| G | <i>Paspalum</i> |
| la | <i>Rhynchosia</i> |
| a | <i>Alternanthera</i> |
| n | <i>Pectis</i> (?) |
| O | + <i>Ipomoea</i> |
| la | woody comp. |
| O | <i>Cordia</i> |
| C | <i>Salvia occidentalis</i> Sw. |
| | <i>Cratogeomys</i> |
| C | <i>Cyperus</i> |
| O | <i>Cyperus</i> |
| C | <i>Cyperus</i> |
| la | + <i>Cuscuta</i> |
| nc | <i>Chilanthum</i> |
| nc | other fern |
| O | <i>Opuntia</i> cf. <i>saricola</i> |
| O | comp. |
| C | <i>Cenchrus</i> |
| la | <i>Cissampelos</i> |
| O | <i>Zanthoxylum fagara</i> (?) |

- r Boneria
 e Aristida
 ec Acalypha
 n Lippia
 n Phyllanthus
 n Chioscoca alba (L.) Bl.
 o + Crotalaria
 n Psidium galapageium Hook. f.
 n + Bidens
 c Setaria
 la Waltheria
 o Cassia
 o Psychotria
 L + Lotus?

The vegetation is generally closed rather bushy, grass dominant, but with a considerable herb component.

Locally abundant a sparsely branched arching cordlike (comp.) shrub, elsewhere Waltheria.

Abundant vines are Cissampelos Rhynchosia, locally blanket out other plants.

Alternanthera forms mats, locally crowding out the grass.

Salvia small patches

Small outcrops of lava occur scattered through the pumice field. In these the 2 ferns are common; Fleurya rare. Cyperus cf. americanus only seen in grassland on pumice on top of one of these outcrops.

Principal grasses,
in order
 Bouteloua
 Paspalum
 Setaria
 Aristida

Around the margins, scattered Bursera graveolens.

Photos (614) from cone to n.w. also photo out toward sea, and one of scrub of cut-like composite shrub.

With it, brown Polypodium Boneria, Cordia, Cereus, Rhynchosia, Froelichia, Lippia, Mollugo, Acalypha, Paspalum Zanthoxylum Bursera inside of cone.

Feb. 3-5 - southwest slope
in broad green strip
running from summit to sea
on well vegetated aa lava
with pumice in the cavities

44979

Phoradendron

18

parasitic on Croton

5

80

Croton scouleri Hook. f. var. scouleri det. Porter 1974

rare

5

81

Acalypha

common

5

82

~~Ph~~ Tournefortia pubescens Hook. f. (det H. Ander ^{sen 1978})

rare

5

83

Cyperus

local on pumice pocket

5

84

Cyperus anderssonii Bockeler det. Koyama 1974

local on pumice pocket

18

85

Cyperus aristatus Rottboell det. Koyama 1974

local on pumice pocket

18

86

Fleurya aestuans Gand.

common

3

87

Doryopteris concolor (Langsd. & Fisch.) Kunth det.

occasional

1

88

Phyllanthus carolinensis Walt. subsp. carolinensis

~~rare~~ occasional

18

89

rare

1

90

Heliotropium parviflorum L.

rare

5

91

Acalypha

common

5

92

Croton

rare

1000'
300 m

large bush, reddish green.

tree 4 m. tall

dwarf shrub.

shrub 2 m. tall

flowers white!

culms spreading.

culms erect, spikes reddish.

stinging herb

Porter 1974

det. D.M. Porter
1974

branches more or less

in one plane

flowers white, on recurved

pedicels, petals ~~apopetalous~~

apopetalous, ovary inferior.

flowers white.

tangled dwarf shrub.

small tree, 4 m. tall, with
erect branches.

- 44993 *Adiantum*
common in crevice of rock
- 7 94 *Passiflora*
occasional climbing in small trees.
- 3 11 95 *Cassia pistaciifolia* var. *picta* (S. Don) ^{det. D. M. Porter}
~~Cassia~~ ^{det. D. M. Porter} 84
occasional
- 2 96 *Polypodium tridens* Kunze det. Porter 1974
epiphytic, common
- 1 97 *Linda hederifolia* Cav. ^{det. D. M. Porter}
rare
- 3 98 *Asplenium pumilum* Sw. Det. Porter
local in crevices and
cavities in rock
- 2 99 *Adiantum* ^{concoloratum HBK.}
^{det. D. M. Porter}
occasional in cavities in rock
- 45000 *Chiococca alba* (L.) Blake
rare
- 5 01 *Polypodium tridens* Kunze det. Porter 1974
common in cavities in rock
- 3 02 *Passiflora suberosa* L.
occasional, climbing in trees
[from with linear lobes]
- 1 03 *Commelina diffusa* Burm. f.
common in shade
- 2 04 (comp.) *Brickellia diffusa* (M. Vahl) Gray
rare in shade
- 5 05 *Pilea baueri* Robins.
common in shade
- 6 06 *Froelichia nudicaulis* var. *sericea*
occasional

vine

shrub 2 m. tall,
flowers deep chrome yellow.

prostrate, flowers orange.

shrub 3 m. tall; fruit
white when ripe.

det. Porter

vine, flower with calyx
pale green, no corolla
corona filaments whitish,
yellow distally, disk and
gynophore purplish, very green;
fruits immature.

det. Porter

prostrate, flowers
pale purplish, closed
in afternoon.

flowers dull buff

erect, stems reddish.

low much-branched
bush. (seed sample)

- 4500 7 *Spermacoce ericifolia* (Hook. f.) Forst.
occasional
- 5 08 *Paspalum galopogeium* Chase ^{galopogeium} var. A
abundant
- 6 09 *Psychotria rufipes* Hook. f.
abundant, mostly under trees.
- 6 10 *Solanum erianthum* D. Don
very common
- 5 11 *Cordia leucophylla* Hook. f. (det. H. Anderson 1978)
occasional
- 8 12 *Solanum (Lycopersicon) cheesmanii*
common
- 5 13 *Asplenium*
abundant in cavities in rocks
- 5 14 *Lippia rosea* (Lam.) Anders.
common det. M. A. D. C.
- same - on open aa
lava flow with scattered
vegetation
- 7 15 *(Solan.) Acnistus ellipticus* Hook. f. ?
rare
- 5 16 *Cheilanthes sulphurea*
common in cavities in rocks
- Notholaena galapogensis* Weatherby & Svens det. Porter 1974

- erect dwarf shrub:
flowers minute, 4 parted, white.
clumps, culms more or
less erect.
- det. D. M. Porter 1974
- diffusely branched,
rather tangled shrub,
to 1 m. tall; flowers
white, fruit red, fleshy.
- det. Porter
- ~~leaves green~~ spreading
shrub, 1-1.5 m. tall;
leaves green beneath; flower
pale purplish.
- shrub, many stems
from base, 2 m. tall;
flowers white.
- diffuse herb; flowers
yellow, ripe fruit greenish
yellow, soft, slightly
acid with rather poor flavor.
(seed sample)
- flowers pinkish to yellowish pink
shrub 1-2 m. tall (others
seen tree-like, to 4 m.)
- small tree 4 m. tall, brittle,
fruits immature

- 45017 (asclaf) *Sarcostemma angustissima* (Anderss.)
(det. H. V. Andersen 1978)
common

- 3 18 *Paspalum galopogium* Chase var. *galopogium*
rare

- 5 19 *Spermacoce*
common

- 7 20 *Scaevola affinis* ^{loc. 1, 7, 7} Hook. f.
common

same - on small spatter
cone with much ~~se~~ fine
pumice deposited on
surface, partly grassy,
partly loose shrubby
vegetation.

beries a broad green
strip running from
the summit to the sea

- 5 21 *Aristida repens* Trin. det. D.M. Porter 1974
common on open scoria rim

- 8 22 *Pomoea cf. alba*
common, climbing on trees
in crater

- 1 23 *Sonchus oleraceus* L.
rare on open scoria rim

- 2 24 *Spermacoce*
rare on open scoria rim

- 1 25 (hepatic)

on shaded overhanging earth bank

- 7 26 *Chiococca alba* (L.) Hitchc.
occasional

almost leafless sprawling
prostrate tangled lactiferous
shrub; petals dark
brown with green margins,
corolla parts pale green,
stigma brownish.

det. D.M. Porter
1974

tufted.

dwarf shrub, erect.

low spreading bushy;
flowers fragrant, white

extensive vine
flowers white, closed
in afternoon, pedicel
inflated.

~~rare~~

glaucous green

small tree 4 m. tall,
flowers yellow.

- 45027 *Zanthoxylum fagara* L. Sarg.
5 common det. D.M. Porter Dec. 1969
- 7 28 *Waltheria ovata* Cav.
common on outer slopes
- 7 29 *Froelichia nudicaulis* Hook. f. f. *lanigera*
common on bare scoria rim
- 7 30 *Cordia revoluta* Hook. f.
common generally
- 5 31 (Comp.) *Blainvillia dichotoma* (Murr.) Stewart
common on scoria rim
- 3 32 *Cyperus aristatus* Rottboell det. Koyama 1974
very local on spot of
pumice on scoria rim
- 4 33 ~~*Lobelia darwinii* (Lam.) Hook. f.~~
Lobelia xalapensis HBK
common on scoria rim
- 5 34 *Esigera Darwiniothaeus tenuifolius*
common on scoria rim
- 1 35 *Cyperus*
rare on scoria rim
- 5 36 *Cenchrus platyacanthus* Anderss. det. D.M. Porter 1974
occasional on slopes
- 5 37 *Gossypium darwinii* Walt
common on outer slopes
near base
- 1 38 *Galactia velutina* Benth.
rare, climbing in bushes
- 1 39 *Lippia*
common on scoria rim
- 1 40 *Salvia*
rare on scoria rim

- small spreading
tree, aromatic when broken,
pinks green.
- det. Porter shrubs 2 m. tall,
fl. branched from base,
flaring at tips. flat-
topped, branchlets in one
plane; flowers yellow.
- (Anderss.) Eliass. depressed much-branched
(det H. shrub.
Andersen 1978)
- det. Porter erect shrub, mostly
branched at base, 2 m.
tall. flowers white.
- flowers white
- shrubs 1.5 m. tall;
disk yellow, rays white.
- culms spreading
depressed.
- shrubs 1.5 - 2 m. tall,
bolls only on dead branches.
- twining, flowers pink,
keels not twisted.
- erect shrub, flowers
pink.
- flowers purplish.

- 45041 *Pectis*? *Chrysanthellum pusillum* Hook. f.
locally common on scoria rim
7 42 (comp.) *Macraea leucifolia* Hook. f.
abundant on scoria rim

same - in open grassy
pumice field.

- 5 43 *Cuscuta gymnocarpa* Engelm. (det. H. Andersen 1978)
common, parasitic
on grasses and various herbs
5 44 *Cyperus anderssonii* Böckeler det. Koyama 1974
common
3 45 *Cyperus ligularis* L. det. Koyama 1974
occasional
2 46 *Chiococca alba* (L.) Blake
occasional
1 47 *Cyperus ~~inermis~~* *Cyperus aristatus*
on top of small exposure
of lava with fine pumice
sand on it.
5 48 *Cenchrus platyacanthus* Anderss. (det. P.M. Porter 1974)
occasional
5 49 *Sporobolus trilobus* L.
common
6 50 *Salvia occidentalis* (det. H. Andersen 1978)
common
c 51 *Crotalaria incana* L.
common

(to p. 170)

flowers yellow, plant
without strong odor
sparsely branched
erect to arching shrubs,
2 m. tall; flowers yellow.

1974

threads dull orange,
flowers white.
small tufts, culms
erect, spikes green.
tufts, leaves glaucous;
culms erect, spikes
reddish green.
shrub 3 m. tall, flowers
yellow, fruits flattened,
immature.

Rottboell det. Koyama 1974

erect, spikelets purple.

creeping; flowers rose pink.
just beginning to close
in middle of day.

prostrate with ascending
branches, forming a mat;
flowers pale bluish.
flowers yellow, flushed
with reddish (but not striate)
outside; buds inflated.

1964. Galapagos Is.

Feb. 6

series of photos on rough
lava and of land iguana.
2 or 3 hot; across pumice.

Apparently more than on
pumice fall
bare cone is complicated
merge into semi-aa with
thin vegetation

Several small grassy
spots on up the slope but
none as large as where we
camped.

Green strip continuous almost
to sea.

East of it at least 7 or 4
ages of flows that have
little vegetation

Where Montelona tussocks
are sparse, mat of Alternanthera
or Rhyssoloma fills interstices.
Bare spots where iguanas
sun themselves, and at
mouths of burrows.

D. Carvajal found young Iguana
at edge of rough lava flow
10 m. n. of camp - with many
volcanoes.

Narborough L. ^{Albemarle I.} 165

Feb. 6 - left Narborough at
10:45 by helicopter
to Dunbar?

South coast of n. w.
peninsula of Albemarle.
gentle slope, dry, open part
of *Bursaria* alternating
with ~~an~~ a deciduous open
scrub. Here and there darker
green trees mixed with
light green *Bursaria*. Toward
sea the scrub is more
prevalent.

Then crossed an area of
green closed to open mixed
forest, some *Bursaria*.

Then a patch of very
rough aa, with some
scattered vegetation.

Then a strip of green closed
low forest, then another
area of very rough aa
with depressions - *hipurina*
with bright green closed
forest.

Then more closed mixed
forest for some distance.
Does not extend to sea, but
gradually fades into deciduous
scrub.

Along come more and more
dominated by *Bursaria* and
become thinner until it is
an almost leafless open *Bursaria* forest

for a long distance - a few scattered dark green trees in it. Becomes thinner. Ground is somewhat irregular. One area is pale green, most gray and leafless. Approaching coast forest gradually fades out, to almost bare, but brown and weathered lava.

A deep inlet on coast with mangrove fringe and a rather extensive patch of mangrove at its head, which runs into a strip of pale green *Bursaria* forest extending inland. Slight mangrove fringe, broken, along coast. In distance considerable mangrove in patches along coast, these extend discontinuously for some distance, backed by a vast lava plain.

Duncan I. - covered by a low deciduous scrub covered by lichens. - arborescent *Opuntia* - scrub of *Croton* + *Prosopis*. Some scrub forest on crater walls. Forest of *Croton* red soil with sparse bushes. Patches of big

Opuntia near top. The scrub is fairly thick. The yellow rocks seen from ship are lichen-covered.

Narborough I. (ctf.)

Cone to west of Pumice flat - slopes have much fresh pumice, and covered by a scrub of the scarcely branched linear-leaved composite, this from open to tangled. The stems are up to 2 m. long. *Cordia* and *Lippia* scattered in with it. Some *Bursaria* in the little crater. Molluscs in open steep spots. A few large *Cereus* on slopes and top.

Waltheria, especially, tending to invade the pumice, also *Cordia*. The woolly composite is common generally, but abundant locally. Both on pumice and on cones and on lava.

Pealeria mostly on open lava. a few on slopes of west cone.

Feb. 6 - ^{Helicopter} Baltra to Academy Bay.
Baltra I. - Large area of exposed red soil with sparse vegetation. Also areas, peripheral, of lava clinker with sparse vegetation.

Indefatigable - wherever the shore is low there are mangrove fringes.

Inland from these vast areas of lava clinker with patches of red soil - sparse vegetation, mostly *Bumera*. This gets denser inland. The patches of red soil get scarcer and gradually vanish.

Inland there are patches of red soil, small - that seem wet. Then none. Pure semi-open *Bumera* forest for miles. Still practically leafless. Until mountains are approached when it gradually becomes greener.

Then a gradual admixture of other trees and a pair of collapsed craters - as the mo saw. Wet forest from here to Table Mt. Ponds still have Azolla. One wild cow.

Brown tree mused with guay (Sealeria). Large area of forest, some of it not

much disturbed, but mostly opened up and with heavy herbaceous undergrowth.

The gradually fades into more open deciduous forest, mostly *Bumera*.

Scrub area only local around Academy Bay.

Feb. 7 - Academy Bay photos of scarp and cactus skyline on south side of Bay also of mangrove on rock, north side, near station. (Kod. only.)

also of Academy Bay settlement.

Left on patrol boat 7 p.m.

Coastal *Cryptocarpus* scrub extends a mile or so along the shore from the station.

Then the shore is a low cliff.

On top of this is an *Opuntia* - *Bumera* forest with a dry leafless undergrowth.

The *Opuntia* soon gets lower. The *Bumera* soon drops out, the scrub, perhaps *Croton*, becomes the dominant vegetation with considerable low *Opuntia*. Perhaps a mile beyond the end of the *Cryptocarpus*, or maybe a bit more, the *Opuntia* becomes

- 45052 *Bouteloua disticha* (HBK) Benth.
det. D.M. Porter 1974
dominant plant
- 5 53 *Alternanthera filifolia* (Hook.f.) Howell
dominant locally
- 5 54 *Setaria setosa* (Sw.) Beauv. det. D.M. Porter 1974
very common
- 5 55 *Cuscuta gymnocarpa* Engelm. (det. H. Andersen 1978)
very common, parasitic on
Rhynchosia and several other
species
- 1 56 *Bidens riparia* HBK. ?
rare
- 1 57 *Psidium galapageium* Hook.f.
occasional, scattered
- 5 58 *Rhynchosia minima* (L.) DC.
abundant locally
- 5 59 *Cheilanthes microphylla* (Sw.) Sw. det. Porter
very common generally
- 5 60 (comp.) *Blainvillaea dichotoma* (Murr.) Stawart
occasional
- 5 61 *Latus*? *Tephrosia decumbens* Benth.
very local
- 5 62 *Cissampelos pareira* L.
locally abundant
- 2 63 *Cissampelos pareira* L. ?
locally abundant
- 5 64 *Passiflora suberosa* L. ?
occasional
- same - on rough aa lava
with little vegetation.
- 3 65 *Cheilanthes sulphurea*
common in cavities

- det. D.M. Porter, 1975
in small tussocks
culms ascending, spikelets secund.
forming a dense mat,
stems purple.
forming small erect
tussocks.
orange threads; flowers
white.

- var. *galapageium*
det. D.M. Porter
Dec. 1969
young plants only, seen, sterile.
vine forming mats;
flowers yellow.
rhizomes buried, fronds
erect.

1974

~~prostrate~~ prostrate; flowers pink.

- ~~erect~~ twining vine,
flowers whitish.
~~erect~~ twining vine,
fruit immature.
det. Porter
climbing bush; flowers
greenish, corolla segment
yellow, ~~the~~ gynophore purplish,
very green.

= *Notholaena galapogensis* Weatherby & Svens
det. Porter 1974

45066

6

Physalis pubescens L.
rare~~67~~ same - in rough as large
~~that~~ with irregular
woody vegetation1 67 *Lippia nana* L.
common3 68 *Croton scouleri* Hook. f. var. *scouleri* det. Porter
occasional4 69 *Tournefortia pubescens* Hook. f. (Det. D. M. Porter)
occasional4 70 *Cordia*
occasional5 71 *Tournefortia pubescens* (Hook. f.) (det. H. Andersen 1978)
occasional3 72 *Cordia leucophylla* Hook. f. (det. H. Andersen 1978)
occasional5 73 (*Solan.*) *Arum* ellipticum
rare5 74 (*fern*) *Trachipteris pinnata* (Hook. f.) C. Chr. det.
abundant generally on
rocks.5 75 *Phoradendron hemslovi*
abundant, parasitic on
Zanthoxylum *bogara*1 76 *Polytrichum*
on dead wood5 77 *Cyperus brachystachys* Anders.
common *Cyperus anderssonii* Böckeler
det. Koyama 19741 78 *Polypodium pectinatum* L.
locally common on rocks1 79 *Commelina diffusa* Burm. f.
occasionalflower yellow with fine
brown rectangles at base
of corolla lobes.

small shrub.

1974

shrub 3 m. tall.

M. Porter

shrub 2 m. tall; flowers
white- tree 4 m. tall; flowers
white.- small tree; flowers
white.

- shrub 2.5 m. tall.

- flowers white.

- small tree about 4 m. tall,
flowers white; fruit green.

Porter 1974

green, spike ~~and~~ dark reddish,
fruit white.yellowish white above,
white below, partially
resupinate.- small tufts, spikelet
green.- *Polypodium dispersum* A.M. Evans det. Porter 1974

det. Porter

prostrate, flowers white.

45080 *Bursera graveolens* (HBK) Triana.
common 6 Planch.

1 81 *Lidya spumosa* L. (det. H. Andersen 1978)
rare

3 82 *Phyllanthus carolinensis* Walt.
common subsp. *carolinensis*
det. D. M. Porter 1974

2 83 *Opuntia cf. sapicula*
occasional same - in open pumice field

Feb. 5 - same loc. on side
of small cone covered
by pumice, with some
lava rock exposed.

5 84 *Dodonaea viscosa* L. var. *spatulata*
rare det. D. M. Porter 1970

4 85 *Phoradendron*
occasional, parasitic on *Zantho-*
xylum pagara

1 86 *Galactea velutina* Benth.
rare

1 87 *Vigna luteola* (Jacq.) SENS.
rare det.

2 88 (moss)

on tree trunks
89 *Phoradendron*
parasitic on *Lippia*

11 90 *Spermacoce*
very common in scrub

5 91 *Tholius notgrassii* Robins (det. H. Andersen)
occasional in open places

2 92 *Cordia revoluta* Hook. f.
common

det. D. M. Porter
Dec. 1969

sterile tree 5 m tall,
bark white, smooth.
flower range calyx
with reddish sulci.
branches more or less
in one plane.

tree with definite trunk,
ripe fruit spherical,
greenish.

(J.E. Sm.) Benth

shrub 3 m. tall.

plant dark reddish green.

flowers pink

flowers yellow, keel
not twisted.

~~shrub~~ plant dark
reddish green.

dwarf shrub, prostrate
to erect; flowers 4 parted, white.
flowers white; rosette
leaves gone from most plants.

1978)

det. Porter

shrub, flowers white, tubular.

176 1964 Galapagos Is.

- 45093 *Phoradendron*
parasitic on *Cordia*
- 1 94 *Phoradendron*
parasitic on #45096 (*Lipochlaena*?)
- 5 95 *Baccharis gnidiifolia* HBK det. Porter
rare
- 2 96 (comp.) *Mouraya loricifolia* Hook. f.
abundant
- 3 97 *Polypodium tridens* Kunze det. Porter 1974
very common terrestrial
- 1 98 (asclap.) ~~Sarcosb~~ *Sarcostemma angustissima* R.W. Holm.
(det. Andersen 1978)
occasional
- 5 99 same - in pumice field
Cordia revoluta Hook. f.
common

Feb. 6 Duncan I.

- 45100 *Croton scouleri* Hook. f. var. *scouleri* det. D.M. Porter 1974
common in low thin scrub

Academy Bay
Feb. 6 Santa Cruz I.

- 1 01 *Portulaca lutea*
planted from material
collected on Plaza I., off
coast of Indefatigable
by Dr. David Snow.

Narborough I. Duncan 2 177
Indefatigable 2

plant ^{dark} reddish green
plant dark reddish green
shrub 1 m. tall.

sparsely branched
erecting shrub 1-1.5 m.
tall, head yellow.
fronds erect.

almost leafless, tacitferous
twining, corolla segment
dark brown with green
margins; corona very pale
green.

det. Porter

erect, fountain-like shrub
with many stems from
base, 2 m tall. flowers
white, tubular.

shrub 1 m. tall, sterile.

8-10 m.

stems ~~erect~~ ascending,
red above, gray-brown
below; flowers 5 cm. across,
petals emarginate,
stamens 38-45, stigma
4-5. Flowers and plant
said to have been much smaller in
wild state.

Feb. 8 Academy Bay

- 45102 *Crocarpus erectus* ^a L.
edge of mangrove
- 2 03 *Laguncularia racemosa* (L.) Gaertn. f.
edge of mangrove
- 2 04 *Maytenus octogona* (L'Her.) DC. det. D.M. Porter 1970
Elaeagnus
common in coastal scrub
- 5 05 *Croton scouleri* Hook. f. var.
common in coastal scrub
- 1 06 *Hippomane mancinella* L.
common in coastal scrub
- 5 07 *Hibiscus tiliaceus* L.
very local in coastal scrub
- 5 08 *Sesuvium* ~~*portulacastrum*~~ ^{*portulacastrum*} L.
common along seashore
- 5 09 *Croton scouleri* Hook. f. var. *scouleri* det. D.M. Porter 1974
common in coastal scrub
- 5 10 *Croton scouleri* Hook. f. var. *scouleri* det. D.M. Porter 1974
common in coastal scrub
- 1 11 *Croton scouleri* Hook. f. var. *scouleri* det. D.M. Porter 1974
common in coastal scrub
- 5 12 *Cordia*
rare, near Nelson house
- 1 13 ~~*rare as*~~ *Lycium*
rare on bare rock
- 1 14 *Mesembryanthemum*
planted in Nelson yard

2 m.

shrub 1.5 m tall.

det. D.M. Porter
Dec. 1969

small tree 4 m. tall.

shrub 2 m. tall.

scouleri

det. D.M. Porter 1974

slender tree 4 m. tall.

lactiferous, poisonous,
small tree.

— small tree, flowers
bright yellow, in
afternoon turning reddish.
prostrate stems
reddish, leaves dull;
flowers pink.
— shrub 3 m. tall.

shrubs 3 m. tall.

shrub

— shrub 1.5 m. tall, flowers
white, fruit red.
shrubs, flowers white.

prostrate to ascending,
very fleshy, flowers
deep orange.

1964 Galapagos Is.

Birds seen on
Narborough at 1000'.

doves

mocking bird

Barn owl

hawk

Vermillion flycatcher

phoebe-like flycatcher

with yellow belly.

finches of a number
of kinds incl. warbler finch.

~~owls~~

Birds seen on Indefatigable?

Brown pelican

Lava gull

Fregatta minor

Curlew

Ruddy turnstone

Mangrove warbler

Vermillion flycatcher

Short-eared owl.

various finches

Mocking bird

green heron

Great blue heron

very sparse and soon essentially disappears, leaving a plain. This is just about opposite Jensen Island. The latter is mainly covered by *Cryptocarpus* scrub, with a clump of a deciduous scrub near center, several white beaches and low dune. A brackish pond with green algal acc. On, who, with Pearlman, brought some plant scraps.

On mainland, the scrub forms a zone extending a bit back from the cliffs. From the cliffs taper off and there are stretches of white beach extending between bits of rocky shore. Not far inland the *Bursaria* forest with some *Opuntia* gradually takes over. It is a bit green. The narrow deciduous scrub zone extends almost to the point, backed by *Bursaria* *Opuntia* with deciduous scrub understory. The point is rocky and very sparsely vegetated. The second small headland

is also rocky but more or less covered by a low yellow-green shrub - also seen on the rocky shores back by the beaches.

Back of this is deciduous scrub with scattered *Opuntia*. Just beyond it, *Opuntia* forest. Back of this and extending up to the foot of the steeper slope is a green forest of *Bursaria* with scattered *Opuntia*.

This gradually fades into the vast *Bursaria* plain on the north side. Some mangroves locally along the shore, bits of white beach. Several small cones in this plain, covered slowly by *Bursaria* forest, but here very sparse. The dark red substratum shows through. The larger cone does not show this sparseness.

Considerable *Opuntia* in this forest.

Patches of mangrove occupy a considerable proportion of this shore. No cliffs here but rock alternating with beach.

On cliffs on n.e. corner of
Seymour (Baltra) a few
plants of *Scalesia crockeri* Bonpl.
(coll. by D. Knowlton), previously
known only from a few
plants on north Seymour cliffs.
These mostly in poor condition, acc.
Knowlton.

Feb. 8 - crossed Salinas point.

Vegetation definitely brown, mostly savanna, e. of Santa Elena.

Conspicuous erosion.

Only distal part of ^{peninsula} visible - the rest foggy.

Inland the landscape is quite green. - savanna open forest and thicket, some cultivated patches - these bright green.

Denser forest farther inland, continuous over fairly large area, rather hilly land.

Looks rather secondary, but this may be because of its seasonal character.

Then cultivated patches are more frequent. Rio Guayas visible far ahead. Country quite hilly along course - Manabí hills? Forest is very green and closed.

As Guayas is approached more and more cultivated patches and more evidence of shifting agriculture. But some substantial patches of what appears to be rather undisturbed forest.

Then large areas of bright green marsh or

wet savanna with winding tidal channels lined by ~~swamp~~ ^{swamp}, then a vast area of swamp with only a few areas of dry land, great intersecting channels, a few bare spots with no vegetation, Batis? around edges.

Swamp stretches southward from large shabby area of extensions of Guayaquil. Then the City, itself.

Wooded hills just to north and west of it.

Feb. 9 - trip, Guayaquil to
Playas

In Guayaquil - street trees
Washingtonia cf. robusta
Cananga odorata
Pritchardia pacifica
Cassia cf. nodosa
Schinus molle
Spathodea campanulata
Ficus microcarpa
Rousettea ovalifolia
Terminalia catappa

Sedimentary hills
 in first several km.
 covered by secondary
 thickets, tangled with
 vines, some slopes with
 grass and scattered trees.

Landscape green Dec. to March
 & April, completely dry the
 rest of year. Rainfall varies
 enormously year to year.

Beyond this hills covered
 by secondary savanna and
 open forest with spaces between
 trees occupied by broad-leaved
 herbs & vines, shrubs, etc.

Savanna character becomes
 rapidly more pronounced westward.
 Great ^{Peibon} *Bombax* relict. becomes
 common. At about km 40
Acacia comes in and soon

becomes abundant.

Near road much of
 land is cleared and
 cultivated. Much
 burning.

Xerophytic character
 increases, and at about km 60
 columnar *Cereus* appears.
Prosopis abundant.

Progress. Turn off toward
 Gulf of Guayaquil to s.w.
 Vegetation here is an open
 scrub forest with many
Cerei - most or all species
 deciduous. *Cordia lutea*
 common. Microphyllous
 component very important.
 Spacing in places
 quite close. In places
 dominantly microphyllous
 small trees or large
 shrubs with scattered
 huge *Bombracaea*.

A large *Hymenocallis* or
Pancratium is common
 locally in more open
 places.

This vegetation is generally
 rather tangled with vines.

Becomes lower and locally
 very open to south, on rolling
 low hills. *Cereus* becomes
 very common locally.
 Km. 73.

Stature only 2-4 m. for most component, the *Cereus* and *bombacaceae*, a few other trees, taller.

General vegetation more and more leafless - scattered trees coming into leaf. Larger ones esp. *bombacaceae* fully leafed out.

About 1 km from coast landscape is greener - open forest & savanna. Very little herbaceous growth. Stature varies locally. number of cacti also.

Large open areas with only scattered shrubs. Sheet erosion very evident. Thin grass on perhaps $1/4 - 1/2$ of the ground. Locally areas of scrub with scattered trees, or of open forest with shrub understory. Playas. Diffuse town of small houses and shacks.

East along beach, for some distance summer cottages abundant.

Beyond these a long strip of sand with scrub lying between Data Lagoon and sea.

Broad flat belt of completely bare salt encrusted soil back of mangroves (photo)

entrance to Data Lagoon mangrove line entrance. Low scrub with, some small *Prosopis*, etc.

grove of *Coronula*.

Scrub is of *Cordia lutea*, *Vallisneria*, *Acacia* sp.

Leucaena, etc. Toward beach *Cordia* is ~~abundant~~ in pure stand. Outside this, a zone of sparse *Sporobolus per-caprae*. (photo - red)

This scrub is discontinuous, each spreading shrub having piled up a small dune of quartz sand around itself. The tops are largely dead, active growth and flowering around periphery. (photo)

Inland a few yards a few patches of *Acacia* and a bush of *Vallisneria*. A small colony of *Leucaena*.

On opposite side of channel to lagoon is a strip of mangrove - almost pure *Rhizophora*, except a few scattered *Avicennia*.

Acacia scrub forms a very flat, very spiny mat.

The lagoon has mangroves in the area toward the mouth, with a rather narrow saline bare zone between the mangrove and the higher ground. Westward the saline zone becomes rapidly broader, near western lobe no mangroves at all, but wide areas of salt flat with herbaceous vegetation around margins.

In thin but closed forest (72.5 km.) bet. San Antonio and Progreso *Carica paniculata* - rare along road. (km 73) *Hymenocallis* sp. very common.

Progreso to Salinas.

semi-open to closed scrub forest, deciduous many trees now leafing out. *Cereus* almost absent.

About km 78 the scrub forest thins to a savanna with some bare bushes in the open spaces.

Cereus become abundant at about km. 81.

Trees become farther and farther apart bare shrubs now abundant.

General aspect becomes more sparse and leafless (km. 95)

Mts. to left are green and wooded.

About km. 96 large area as actual desert with bare ground, scattered bushes. Some distance from highway appears to be savanna with thin low grass.

About km. 100 the ground is higher and varies from savanna to scrub forest. Alluvial hills.

Beyond this a rather open savanna. This becomes gradually more sparse and desert-like. Few shrubs ^{green} trees.

Beyond crossroad to much of country is true desert. Sheet erosion is very evident.

Km. 115.

About km. 116 bushes become more abundant to form a leafless open scrub about 1-1.5 m. tall. Small area is much dug up for gypsum (?) lumps used in making cement.

One area here green with *Cryptocarpus*.

Scrub thins out some. (to p. 194)

Feb. 9 - mouth of Data Lagoon,
e. of Playas
on sand flats, back of beach

45114

Cordia lutea Lam.

2

dominant in open scrub

2

15 *Acacia*

common component of scrub

1

16

Ipomoea pes-caprae nesp. *basiliensis*
in open loose sand

2

17

Vallesia

common in open scrub

2

17a

Lantia

common in scrub

Feb. 9 -

bet. San Antonio and

Progreso, km 72-73 on road

to Playas from Guayaquil

edge of open scrub forest

1

18

Hymenocallis

very common locally

3

19

Carica ~~*flavescens*~~ *parviflora* (A. DC.) Solms
rare

Feb. 9

on coast east of Santa Elena

1

20

Lycium

common in low scrub

1-2 m.

spreading shrub; flowers
bright yellow; fruit white, fleshy.
shrub up to 2 m. tall,
flowers orange-yellow.
sterile, seeds from sand surface.

(L.) v.
ontotr.

shrub 1 m. tall, flowers white.

shrub 2 m. tall, stems and
spines green, flowers yellow-green,
ripe fruit red, most fruits immature.

flowers white.

unbranched, 1 m. tall,
cymes and buds red, inside
of corolla pink.

3 m

rigid shrub; flowers white.

Km. 124-5 desert with sparse low shrubs. *Acacia* locally common. More vegetation near Santa Elena.

East from Santa Elena, over low hills with sparse scrub, down to sea. Road along beach ridge. Back of beach ridge an enormous silt flat, bare with mats of ~~*Syntherisma*~~ *Maytenus*. Beyond this low bare hills of silt or siltstone. Sparse scrub. Some arborescent *Cerei*.

These are along coast. Vegetation a depressed open scrub of *Maytenus* and *Lycium*. Some taller shrubs and *Cereus* back from shore on hills. Flats salt crusted.

Bare silt flats, on way back, examined very quickly. Friable cracked silt. Locally a few small *Evolvulus* sp. otherwise no vegetation.

On slightly higher (a few cm) ground, *Maytenus* with very thick leaves, trees held vertically and a few bushes of *Lycium* and *Laguncularia* (?), very depressed.

(Photos - Kod.)

(photos)

one label unless otherwise noted

Galapagos

Plants collected by Allyn Smith

Tower Island, Jan. 30, 1964

(12) 1 *Opuntia*

(12) 2 *Opuntia*

Jensen I., off coast of Indefatigable I.
Feb. 1964

3 *Lycium*

4 *Sesuvium portulacastrum* L.

5 *Portulaca lutea* L.

6 *Heliotropium curassavicum* L.

Plants collected by David Cavagnero

Narborough I., green strip on SW slope

Feb. 4, 1964

1 *Asplenium*

Inside tiny cave on walls of shady damp lava
2500 ft.

2 *Sarcos oleaceus* L.

On punice in *Polypodium* zone 2500 ft

3 *Desmodium*

Polypodium fern zone, 2500 ft. Flowers pale blue

(4) 4 *Psilotum nudum* (L.) Beauv.
2500 ft

(2) 5 *Nephrolepis*
2500 ft

(2) 6 *Blechnum occidentale* L.
2500 ft

7 *Adiantum*
2500 ft

8 *Asplenium*
2500 ft

9 *Asplenium*
2500 ft

~~100~~ *Polypodium* most common fern on all floors
2500 ft

10 *Pteridium aquilinum*common only in depressions where moisture collects
2500 ft11 *Thelypteris*

2500 ft

12 *Asplenium*

2500 ft

13 *Asplenium*

2500 ft

(2) 14 *Pityrogramma calomelanos*

2500 ft

(3) 15 *Polypodium*3000 ft most common fern on old flows, chief
ground cover in wet areas high up.16 *Cyperus recurvus*?

3000 ft on pumice sand of old land - iguana run

17 *Polypodium*3000 ft epiphyte on *Zanthoxylum* sp.18 *Eragrostis*

2500 - 4800 ft

19 (comp.)

2500 - 4800 ft

20 *Erigeron*

2500 - 4800 ft

21 *Spermacoce*

2500 - 4800 ft

(2) 22 (comp.)

2500 - 4800 ft

23 *Mollugo*

2500 - 4800 ft

24 *Spermacoce*

4800 ft

(2) 25 *Solanum*

4800 ft large clumps growing at edge of Scaevola zone, on

deep ash sand near crater rim

26 (lichen)

do not type
pencil number

Plants collected by E. Yale Dawson

Albemarle I. ~~shore~~

24951

Euphorbia

shore, 25 Jan. 1964

24952

Candelia?

26 Jan.

(1) 24953

Prosopis

near shore. 26 Jan. prostrate

24954

Alternanthera echinocephala (Hook. f.) Christ.

near South shore. 26 Jan.

24955

Waltheria

South shore, 26 Jan.

(1) 24956

Coldenia

S. shore 26 Jan.

24957

Ipomoea

S. shore 26 Jan.

Bindloe I.

(1) 24958

Jan. 26

(1) 24959

Waltheria

Jan. 26

(1) 24960

Coldenia

Jan. 26

(1) 24961

Croton

Jan. 26

(1) 24962

Euphorbia

Jan. 26

24963

Cordia lutea Lam.

Jan. 26

24964

Euphorbia

Jan. 26

200

24965

(1)

#

Spermacoce

Jan. 26

24966

Ipomoea

Jan. 27

James Island, James Bay, Jan. 27

24967

(Asclep.)

24968

Opuntia

(2)

(1) 24969

~~Scutia~~
~~Dioscorea~~

(3)

(3) 24970

Tournefortia

(3) 24971

Acacia

(2) 24972

Bursera

(2) 24973

"Lipochaeta"

(2)

(2)

Brunborg, E. + Petersen, C. E.

Rundt, jorden rundt på tornmannshånd.
1-254 Oslo, 1948.

Account of voyage, including
visits to Jan Mayen and Looe Keeling,
in Norwegian.

Syuzo Ito

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COX, Allan
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MARTIN, Edgar
MC BIRNEY, Alexander
MILLER, Alden
MILLER, Robert
MURPHY, Jack
NAHMMACHER
ORR, Robert
ORTIZ, Fernando
QUEVEDA, Alejandro
QUINTERO, Pilar
PALMER, Clarence
PAPENFUSS, Ted
PERLMAN, David
PYLE, Robert
RICK, Charles
ROBLIN, Alfred
RODRIQUEZ, Gladys
SCHUSTER, Robert
SILVA, Paul
SMITH, Allyn
SNOW, David
STEBBINS, Robert
STEPHENS, Stanley
TORY-PETERSON, Roger
USINGER, Robert

VAN STRAELEN, Victor
VERCAMMEN*GRANDJEAN,
WALKER, Boyd
WEBER, William
WHITNEY, Pete
WIGGINS, Ira
WILLIAMS, Howel
ZULLO, Victor

1/22 dinner

Dawson

20959 - *Waltheria*
ovata Cas.

24912 *Castela galapagensis*

24918 " "

24955 *Waltheria ovata*

24969 *Leutia pauciflora*

(Hook. & G.) Walp.

24972 *Bursera graveolens*

(HBK) Trimen & Pl.

Leveque

34 *Canna lambertii* Lindl.

182 *Waltheria ovata*

111 *Passiflora columbianii* Wieg.

170 *P. foetida* v. *galapagensis* Kelly.

118 *Capraria peruviana* Benth.

32

29 *Erythroxylon* " " Benth.

176 *Habenaria weberiana* Garay

136 *Leutia pauciflora* (Hb.) Rehb. & G.

155 " " "

74 *Solanum americanum* Mill.

49 *Datura innoxia* Mill.

U S.

Josberg. coll.

Galapagos

Rubiacaceae

Ceylon

Josberg 1970

Labels in

USS PINE ISLAND (AV-12)

2 February 1964

Tentative Helo Flight Schedule for the period 2-10 February 1964 in support of the National Academy of Sciences Project, Galapagos.

All flights except 2 February will depart Isla Baltra at 0900s and return to Isla Baltra at about 1130s daily.

SUNDAY - 2 FEBRUARY

- a. 0600 - take off. Clockwise circles of Roca Redondo, N.W. tip Albemarle, and land at Punto Espinoza. Pick up 3 people (Usinger, Schulke, and Perlman). Return to ship via N. Albemarle.
Starting from ship: Cohen, Bowman, McBirney, Fosberg.
Return 0730.
- b. 0830 - take off to Punto Espinoza, drop Billeb and pick up Kiester.
Recon. of S. Narborough and supply drop; then return Baltra.
Starting from ship: Hendrickson, Billeb, Dawson, Williams.

MONDAY - 3 FEBRUARY

0900 - take off.

To S. Narborough and drop off Hendrickson, Kiester and Fosberg.
Starting from Baltra: Hendrickson, Kiester, Fosberg, McBirney (returns to Baltra.)

TUESDAY - 4 FEBRUARY

0900 - take off.

To Jervis and drop off Dawson, then to Punto Espinoza and drop off Cox; return to Baltra.

To S. Narborough and drop off Ashlock and Cavagnaro; pick up Dawson from Hervis and return to Baltra.

Starting from Baltra: Dawson (returns), Cox, Ashlock, Cavagnaro.

WEDNESDAY - 5 FEBRUARY

0900 - take off.

To Punto Espinoza, pick up Cox and Billeb; on to Cape Berkeley and drop off Williams, McBirney and Cox; return to Baltra with Billeb.

Starting from Baltra: Williams, McBirney.

THURSDAY - 6 FEBRUARY

0900 - take off.

To Cape Berkeley and pick up Williams, McBirney and Cox; then to Togus Cove to drop off above 3; then to S. Narborough to pick up Fosberg; Cavagnaro, and Ashlock; then to Duncan and drop off Cavagnaro and Ashlock; then to Academy Bay for drop off of Fosberg and Billeb.

Starting from Baltra: Billeb.

FRIDAY - 7 FEBRUARY

0900 - take off.

To Togus Cove and pick up Williams, Cox, and McBirney; then to Jervis and drop off there 3.

Start from and return to Baltra empty.

SATURDAY - 8 FEBRUARY

0900 - take off.

To Jervis and pick up Williams, Cox and McBirney; then to Duncan, drop Cox and Williams and pick up Ashlock and Cavagnaro; then to N.W. corner James and drop off McBirney, Cavagnaro and Ashlock.

Starts from and returns to Baltra empty.

SUNDAY - 9 FEBRUARY

0900 - take off.

To Duncan and pick up Williams and Cox; then to N.W. James, drop off Cox and pick up Cavagnaro and Ashlock; then drop off Williams, Cavagnaro and Ashlock at Academy Bay.

Start from and return to Baltra empty.

MONDAY - 10 FEBRUARY

0900 - take off.

To S. Narborough and pick up Hendrickson and Kiester; on to N.W. side of James and pick up McBirney and Cox.

No scientists start from ship; all 4 are picked up and returned.

Brunborg, E. + Petersen, C. E.

Runde, jorden rundt på tomannshånd.
1-254 Oslo, 1948.

Account of voyage, including
visits to Tuamotus and Coco Keeling.
in Norwegian

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